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Theories of
M E M O R Y

Theories of M E M O R Y

By

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RETENTION AS A BIOLOGICAL CONCEPTION

WHEN Prof. Ewald Hering read his paper 'On memory as a Universal Function of Organised Matter' to the Imperial Academy of Science at Vienna, 30 May 1870, he made Memory a biological problem, and such it has remained. One may question whether this presentation left the old memory problem of epistemology and psychology untouched, whether it replaced it, in the sense of substituting a wider for a narrower issue, or whether it merely put the old problem of the philosophers in a new light? It is therefore worth while to follow out the issues raised by Hering's paper. It was new to conceive of one function, reproduction, as the ground not only of memory, but of all increase in facility, of all material growth, and, further, to see in such a function the explanation of ontogeny and of the inheritance of acquired characteristics. Memory for Hering is the *Urvermögen* which links the phenomena of the body and the phenomena of the mind into one single series.

'Between the "me" of to-day and the "me" of yesterday lie night and sleep, abysses of unconsciousness, nor is there any bridge but memory with which to span them. . . . The bond of union, therefore, which connects the individual phenomena of our consciousness lies in our unconscious world; and as we know nothing of this but what investigations into the laws of matter teach us—as, in fact, for purely experimental purposes, "matter" and the "unconscious" must be one and the same thing—so the physiologist has a full right to denote memory as, in the wider sense of the word, a function of brain substance, whose results, it is true, fall, as regards one part of them, into the domain of consciousness, while another and less essential part escapes unperceived as purely material processes.' (Translation from Hering in *Unconscious Memory*, S. Butler, ch. vi, pp. 110, 111.)

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Hering states the now thorny doctrine of the inheritance of acquired characteristics with the utmost simplicity, and, one may add, utmost clearness in the following passages :

‘ We have ample evidence of the fact that characteristics of an organism may descend to offspring which the organism did not inherit, but which it acquired owing to the special circumstances under which it lived ; and that, in consequence, every organism imparts to the germ that issues from it a small heritage of acquisitions which it has added during its own lifetime to the gross inheritance of its race. . . . Many mystical theories have been propounded for the elucidation of this question, but the following reflections may serve to bring the cause nearer to the comprehension of the physiologist. The nerve substance, in spite of its thousandfold subdivision as cells and fibres, forms, nevertheless, a united whole, which is present directly in all the organs—nay, as more recent histology conjectures, in each cell of the more important organs—or at least in ready communication with them by means of the living, irritable, and therefore highly conductive substance of other cells. Through the connexion thus established all organs find themselves in such a condition of more or less mutual inter-dependence upon one another, that events which happen to one are repeated in others, and a notification, however slight, of a vibration set up in one quarter is at once conveyed even to the farthest parts of the body. With this easy and rapid intercourse between all parts is associated the more difficult communication that goes on by way of the circulation of sap or blood.’ ‘ An organised being, therefore, stands before us a product of the unconscious memory of organised matter, which, ever increasing and ever dividing itself, ever assimilating new matter and returning it in changed shape to the inorganic world, ever receiving some new thing into its memory and transmitting its acquisitions by way of reproduction, grows continually richer and richer the longer it lives. Thus regarded, the development of one of the more highly organised animals represents a continuous series of organised recollections concerning the past development of the great chain of living forms, the last link of which stands before us in the particular animal we may be considering. . . . He who marvels at the skill with which the spider weaves her web should bear in mind that she did not learn her art all on a sudden, but that

innumerable generations of spiders acquired it toilsomely and step by step—this being about all that, as a general rule, they did acquire.' 'All this is as wonderful as when a greyhaired man remembers the events of his own childhood ; but it is not more so.' (ibid., pp. 118, 125, 129, 123.)

It was as a contribution to the theory of evolution that Hering's paper attracted attention in this country. Prof. Ray Lankester drew attention to it in a letter to *Nature*, 13 July 1876. Samuel Butler welcomed Hering as a champion of the theory of evolution which he, in total ignorance of Hering's paper, had set forth in his book, *Life and Habit*, 1877 ; and it is in virtue of this teaching that he incorporated a translation of the paper in his book, *Unconscious Memory*, 1880. The significance of Hering's teaching in this direction, however, must not blind one to the wider question suggested by the title, 'Memory as a Universal Function of Organised Matter'. Memory is not merely a term to denote a given collection of facts, but is used as an explanatory principle. Advance of the race, reproduction of one generation by another, material growth, increase in skill, recollection of the past, these are all explained by that function which is universal in organized matter : memory. If one tries to generalize these very diverse facts and regard them as a class one may term them each and all 'after-effects' of stimulation. They are for Hering 'reproductions' of an original effect which he conceives as retained, and it is Memory which makes the retention of the effect and its reproduction possible. He conceives that 'after both conscious sensation and perception have been extinguished, their material vestiges yet remain in our nervous system by way of change in its molecular and atomic disposition'. Presumably what was true of the nervous system was regarded as true of those simpler phases of organic matter of which Hering speaks. The 'after-effects' of stimulation would be retained as change in the molecular or atomic structure of fibre and cell. As Butler

comments in a foot-note to his translation of a relevant passage,

'Memory was in full operation for so long a time before anything like what we call a nervous system can be detected, that Prof. Hering must not be supposed to be intending to confine memory to a motor-nervous system. His words do not even imply that he does, but it is as well to be on one's guard. (ibid., p. 115.)

Butler, indeed, seems to have some difficulty with Hering's presentation of his doctrine, and inserts frequent foot-notes to correct his author's wording to what he conceives to have been his intended meaning, or rather, perhaps, to what he conceives *ought* to have been his meaning. The difference between the two is not unimportant. Hering gives a 'structural' conception of retention, and Butler corrects this to a 'functional' conception. This difference in conception will be touched on later.

Hering limited memory to organized matter, but if a molecular or atomic change be the central fact of the phenomena grouped together as 'after-effects' of stimulation, then changes in the physical and chemical properties of bodies, e. g. in elasticity or conductivity, in consequence of repeated use, should also be regarded as due to memory. (Cf. *L'Évolution de la Mémoire*, H. Piéron, 1910.) We will consider the implications of Hering's theory in the work of his lineal successor, Dr. R. Semon. (*Die Mneme*, 3rd ed., 1911.) Semon uses the term 'Mneme' for memory in Hering's sense, viz., a general function of all organic matter, and he tries to establish the general conditions under which such a memory occurs. Human memory is but a special case of Mneme, and is dealt with in his book, *Die mnemischen Empfindungen*. The central fact to be explained is the reproduction or return of some response when the original conditions which gave rise to it are not repeated in their entirety. The problem embraces both the reproduction of response to stimulation

by the individual and the reproduction of characteristics in ontogeny.

Semon reaches the conception of Mneme from the conception of stimulus. 'No action is a stimulus which does not produce some corresponding physiological change. Thus there can be no stimulus in the case of an inorganic body, nor in that of an organism after extinction of life.' (*The Mneme*. Trans. 1921, p. 1.) In relation to the stimulus as exciting cause the ensuing change is effect. The excitation effect dies away, sometimes rapidly, sometimes more slowly, but there is an abiding effect of the stimulus which remains; this is the after-effect or engram. The contention is that without this hypothesis of an after-effect which manifests itself in later responses, being brought forth (ecphory) side by side with the primary effect of the operating stimulus, one cannot adequately explain animal or plant behaviour, and in particular one cannot account for the facts of ontogeny and heredity. On the other hand, given such a hypothesis, Semon claims that all these facts are brought into line and are harmonized with the psychological facts of memory. The hypothesis is also a specific against 'Vitalism'. It is a plank of rescue for the thinker who is baffled by his inability to explain physiological effects in terms of the stimuli operative at the time when the effect occurs.

The nature of the engraphic effect of stimuli, Semon admits, is not explained, but in the third edition of *Die Mneme* he repudiates the suggestion that anything immaterial or metaphysical is intended.

'On the contrary, I have conceived and definitely described it as a material alteration. I made the point clear in describing the engram as a change left behind in the irritable substance after the excitation has died down. As the altered state of a substance, the engram must necessarily be substantial or material, and may therefore be quite correctly described as a material alteration.' (*ibid.*, p. 275). 'We are not in a position to say more than that after a vigorous stimulation has run its course the change which is produced is to be conceived

as a change in the excitable substance, that is, as a substantial or material change.' (*Die mnemischen Empfindungen*, pp. 138, 139.)

In other words that which persists is structural.

Now one may raise two questions : first, how far is ' Mneme ' a necessary postulate for the explanation of the phenomena referred to ; second, how far is it true that it brings biological facts into line and harmonizes them with the psychological facts of memory, and, further, saves the thinker from relapse into vitalism ? For the first point we must consider ' mnemic ' causation.

An application of the law of a fixed quantitative relation between cause and effect entitles Semon to say, ' the existence of an engram is recognised by the fact that the unaltered original stimulus is no longer requisite for the production of the corresponding reaction.' (*Die Mneme*, p. 69.) Since the reaction (effect) is quantitatively the same, the weakened stimulus (cause) must be augmented by something, and that something is the engram.

An engram can be called forth (i) by a repetition of the original stimulus in a qualitatively or quantitatively identical, or partially identical, form ; (ii) by the ecphory of an engram which was generated at the same time or immediately before the engram in question ; (iii) by the lapse of a given period of time, a cycle, which brings about a given energetic condition in the organism.

Taking the first set of conditions, Semon cites the cases where a stimulus produces the same response though it is applied for a much shorter time, or is of lessened intensity, and the cases where it produces upon repetition a much greater response than at first. The relation between stimulus and response is said in each case to involve the engraphic effects of previous stimulation. Cases of simple summation of stimuli, or of fatigue, both of which may give a relation between stimulus and response of the kind indicated, are ruled

out of court. In fatigue, Semon considers that a second indifference state has not been established before the new application of the stimuli. In summation of stimuli, he considers that the interval between the stimuli is too short to allow of engraphic effects. One excitation has not died away before another is received. As an illustration of engraphic effects of the type contemplated, Semon refers to the experiments by Davenport and Cannon on *Daphniae*. These show that at the third application of a strong light-stimulus the heliotropic movements of *Daphniae* take place in about half the time of the original response.

‘Slight qualitative deviations from the original stimulus do not, however, invalidate the ecphoric action of a stimulus on the engram belonging to the original stimulus. Thus, it is sufficient to see the picture of a landscape in order to be able to ecphorize the engram belonging to the landscape itself; to hear a tune hummed in order to ecphorize the engram belonging to the original full orchestral performance. If the smell of Selene gas ecphorizes in us the olfactory engram of rotten radish, it is clear that one ecphoric stimulus has vicariously replaced another which from a chemical point of view is altogether different.’ (ibid., pp. 45, 46.)

As an instance of the second set of cases Semon refers to observations by Prof. Lloyd Morgan. Young birds when newly hatched peck at any and all objects of convenient size. Prof. Lloyd Morgan threw before some young chickens caterpillars which are conspicuous for their marking of black and gold rings, and which presumably are unpleasant in flavour to the chickens’ palate, for after picking them up the chickens at once dropped them. And although subsequently they ate readily of other caterpillars, they always avoided those of the first variety. According to Semon one experience sufficed to establish an association of optic and chemical engrams. Whenever the sight of the caterpillars called forth the optic engram, the chemical engram came with it and the caterpillar was left alone.

As instances of the third set of conditions Semon gives the rhythmic fall of the leaf in autumn and the bursting of the buds in spring,

‘A central European beech, which stands in full vegetation from May until September, reaches in the latter month an organic state which acts ecphorically on that engram whose successive reactions consist of food circulation from leaves into branches and root-stems, and of the fall of leaves. This ecphory takes place in the beech in autumn irrespective of those specific influences of temperature which rightly are expected to act at that time of year, and which by abnormal mildness fail to come into play. . . . We conclude that the time period as such does not act ecphorically, but that the ecphory is due to the appearance of a definite state associated with the respective engram, and that this appearance is determined in time, in so far as it takes place on the conclusion of a definite number of life processes which may be estimated from the moment chosen as the starting-point. . . . I term such engrams and their ecphory “chronogeneous”.’ (ibid., p. 55.) ‘The “migration impulse”, innate in so many species of birds, is the motor reaction of an inherited engram, a reaction produced by chronogeneous ecphory.’ (ibid., p. 72.)

Now, how far is a special theory of ‘mnemic’ causation essential in these three types of cases? We find a writer who champions the mechanistic conception of life, making no use of Mneme in accounting for just such cases as those dealt with under the first set of conditions. We may parallel the response of the *Daphniae*, cited by Semon, with this account given by Prof. Loeb of the reaction of winged aphids to light. Two factors are regarded as determining the movement of the aphids: (1) the structure of their bodies, (2) the photochemical action of the stimulus. If light fall on the aphids from one side only, the processes in the muscles on that side are accelerated; first the head and then the body turns towards the light. After having gone through heliotropic reactions a few times, the aphids respond more quickly than at first.

'This might be interpreted as a case of "learning". In so far as it is not a case of a lessening of the stickiness of the feet or the removal of some other purely mechanical factor which retards the rate of movement, it may be brought about by the carbonic or lactic acids produced through the muscular activity.' (*The Mechanistic Conception of Life*, pp. 40, 45.)

The important point to notice here is that there is no reference to anything which can be regarded as a 'second indifference' state. The change in reaction is a necessary consequence of a change in the nature of the beast. Is there any fundamental difference between Dr. Semon and Prof. Loeb? Both agree that on the second occasion different factors are at work, and hence the effects are different. It is true that some of the factors owe their presence to the operations of past stimuli, but does this render them different in character from members in any other physical chain of causal sequence? What is the distinction between earlier and later effects in an instance such as this, and their relation in an inorganic series of events? The effects of previous blows of a cold chisel make possible the cleavage of a rock at the n th blow, but the effect of the n th blow would not be described by Dr. Semon as due to the ecphory of the engrams of the $n-1$ and $n-2$, &c., blows. Why then should the effects of past stimulation *which are actually represented in the physico-chemical state of the organism* be regarded as a special variety of causation requiring a new 'mnemic' principle?

We will for the moment leave the second set of conditions, and consider the third, chronogeneous ecphory. As before we may find parallels to the instances given by Dr. Semon if we turn to the pages of Prof. Loeb. The following example of the role of tropisms in self-preservation supplies an instance intermediate between that of the fall of the leaf in the beech tree and that of the migration of birds. The butterfly *Porthesia chrysorrhoea* lays its eggs on a shrub. The larvae hatch out in autumn, and remain on the lower branches of the shrub during the winter. When in spring the warm weather comes,

they crawl up to the top of the plant and feed on the fresh young leaves. Prof. Loeb says that this life-preserving action would be attributed by some writers to an ancestral memory ; it is, however, only the result of positive heliotropism. In proof he tells us that if the same larvae are enclosed in test-tubes lying with their horizontal axes towards the light, the larvae will crawl up the tube to the light and starve there at the end of the test-tube. This will occur no matter how many of their favourite leaves may be placed in the tube behind them. They are ' slaves of the light '. Similarly they would stay at the top of the plant after the young leaves were consumed and so starve, if they did not lose their positive heliotropism. But owing to the chemical changes produced in them by feeding, they lose their heliotropism and are free to creep down the shrub to fresh food. (*Forced Movements, Tropisms and Animal Conduct*, pp. 161, 162.) Here the action of light on the organism in a given condition brings about a certain response, and that response would not have been given if the organism had been in a different state ; but the condition in question is not itself considered as a special effect of the organism's line of ancestry requiring to be differentiated as a ' mnemic effect ' from other characters the organism may possess. In such cases Prof. Loeb regards the machine of the plant or animal as responding to a fixed cycle of events.

It is permissible to doubt whether Dr. Semon introduces any new principle. Just as he ruled out cases of fatigue and summation of stimuli from the class of cases falling under the first set of conditions, so here he would rule out from chronogeneous ecphory such rhythms as those of respiration and pulsation, on the ground that the irritable substance has not had time to return to the state of indifference before the repetition of the stimulus. But such a ground of differentiation seems artificial. The repetition of a cycle of events and the repetition of a single event are not in essence different, even though the former requires an interval for its completion.

Both may have the same relation to the so-called 'state of indifference'. Dr. Semon writes with reference to phasogeneous ecphory—a special case of chronogeneous ecphory, viz. the ecphory of a given engram at a certain stage in the development of the individual,

'Phasogeneous ecphory also is, after all, nothing else but the recurrence of a definite internal energetic condition, and numerous facts given in the statistics of development and confirmed by experimental embryology teach us that frequently the partial recurrence of this condition is sufficient.' (ibid., p. 147.)

Here again, then, we may ask, why single out engrams when the present condition of the organism determines the response? Does the whole case for 'mnemic' effects depend on the recurrence in question being *partial*? That is, are all engraphic effects in essence 'associative'? Apparently this is the case.

'Our previous investigations have furnished evidence that one essential distinction between original and the corresponding mnemic excitations lies in the fact that the former are generated by a definite original stimulus-complex, while the latter may be roused by any one constituent of that complex.' (ibid., p. 174.)

If this is so, then may one not dispense with engraphic effects in all those cases where the conditions requisite for the response can be found in the conditions synchronous with the stimulation? In short, may we not reduce the cases of ecphory to cases of the second type, viz., the ecphory of an associated engram? Let us suppose with Dr. Semon that only the ecphory of engraphic effects and their homophony, as he terms it, with the effects of present stimulation will account in certain cases for the response given. For instance, to use Dr. Semon's own illustration, a present smell of olive-oil results in a vision of Capri as seen from the Bay of Naples. This result of stimulation is due to the homophony of the

olive-oil smell with the engram of the olive-oil smell which in the past reached Dr. Semon from a small restaurant at Naples, and to its associated engram, the sight of Capri. Or again, to take the case of ontogenetic phenomena, the ecphory of engraphic effects is posited when reactions are given at some phase of development where normal conditions have been disturbed.

‘By mutilating the developing eggs of Echinoderms, Annelids, Ascidians, Molluscs, &c., serious changes of the conditions may be effected without any immediate essential alteration of the course of development within the remaining parts of the system. . . . We have already found it characteristic of mnemonic phenomena . . . that they require for their ecphory but a fraction, arbitrarily chosen it may be, of the conditions which were required to generate the corresponding original excitations. It is clear that ontogenetic phenomena resemble the mnemonic phenomena in so far as in their production fairly large and arbitrary subtractions may also be made from the conditions which normally obtain.’ (ibid., pp. 176, 177.)

How are we told to think of the engraphic effect whose presence is regarded as essential to explain the response manifested? We are told to conceive of it as some physico-chemical condition existing in the organism at the moment of stimulation. But in that case why should we distinguish it from that total structure which is presupposed as the internal condition of the organism to determine the nature of the response? If it constitutes part and parcel of the nature of the machine, why should we distinguish it from a hypothetical state of the machine wherein it would be absent? Are we required to divide the response into parts: *a*, response of certain features in the machine; *b*, response of certain other features; *a* and *b*, response of total machine? Obviously this is not the same thing as saying, *a*, response of the machine as it might have been, and *ab*, response of the machine as it actually is.

Prof. Loeb finds no new principle in associative memory,

and it is difficult to understand why Dr. Semon does so. In discussing stimulation and excitation, and after expressing doubt whether Prof. Loeb has penetrated into the nature of the process of excitation, Dr. Semon concludes, 'Without doubt, excitation is at bottom a physico-chemical process and nothing else, and the engram simply a residual physico-chemical modification. But as we are still lacking any real insight into the physics and chemistry of these processes, it would be the greatest mistake to discard the serviceable definitions of stimulus-physiology and to deceive ourselves about the distance which still separates us from the goal of a purely physico-chemical interpretation.' How definitions of a physico-chemical engram, of ecphory, homophony, &c., are to clear our vision as to the distance in question, Dr. Semon does not say. We are back at the position reached in discussing the instances cited under the first set of conditions of ecphory; viz., the position of recognizing that *certain features in the present state* of the organism owe their existence to the operation of past stimuli, but that this did not entitle them to be called *mnemic* effects, unless that title was to be given to every member in a chain of causal sequence which has some prior member as its cause. We may conclude that 'Mneme' as a general term to denote special after-effects of stimulation characteristic of organic, as distinguished from inorganic, matter, is an unnecessary term, so long as these after-effects are conceived as physico-chemical modifications of substance. This is not the place to consider the difficulties of conception which attend the theory of physico-chemical modifications when each stimulation is said to generate a new engram. It is sufficient to notice that the engrams acquired by the individual are said to be localized in the area concerned with the excitation; but that in the case of the stock of engrams inherited from the race (as distinct from those inherited from the parental acquirements), 'it is most probable that the engram-stock may be encompassed by some-

thing smaller than the cell or even the nucleus of the cell.' (ibid., p. 205.) I wonder whether it is merely imagination or whether it is thought which jibs at the diversity of patterns which such a fragment of tissue must be made to yield in its ultimate elements.

As regards our first question, then, we would say 'Mneme' is a gratuitous, not a necessary, postulate.

Turning to our second question, even if not necessary, how far does the adoption of the hypothesis of mnemonic effects serve to bring biological facts into line and harmonize them with the psychological facts of memory, and aid the thinker to avoid the relapse into vitalism? 'Physiology as the science of actual life cannot dispense with the investigation of the past.' (ibid., p. 293.) It is apparently the force of this exigency that causes the thinker's fatal lapse. Can the conception of 'Mneme' meet this need? Dr. Semon asserts that the 'Mneme' 'in the organic world links the past and the present in a living bond'. If what we have said in respect of Mneme as a gratuitous hypothesis is well founded, there is no need to discuss this claim in detail. Hering claimed that memory linked the mental and the material in one series. He demonstrated his point by translating the mental into material brain processes. Now Dr. Semon claims that 'Mneme' links the present to the past, and, having carefully translated the past into present physico-chemical conditions, he, too, may appear to have proved his contention. With both writers, however, the more volatile member of the pair eludes the coupling. We are left with only a verbal semblance of the promised union. The mental is not thus to be compressed into the mould of the material, nor the past to be thus cribbed within the confines of the present. If memory as treated by psychology is to deal with the past, with knowledge of what was, as distinguished from performance that *is*, the theory of 'Mneme' cannot harmonize the facts of biology with those of psychology, and consequently cannot save the

disappointed thinker from vitalism, if indeed his salvation depends upon this achievement.

Is then the conception of memory introduced by Hering and adopted by Dr. Semon psychologically meaningless? The answer so far reached is 'yes', if it is interpreted, as it was by Hering and by Dr. Semon, structurally. But there are other possibilities.

We noticed that Butler had trouble with Hering's account of material vestiges and preferred a theory of diminutive vibrations. Now what was at the root of this difference? It is necessary to develop Butler's view more fully. In his chapter introducing Hering's lecture Butler wrote :

' Another matter on which Professor Hering has not touched is the bearing of his theory on that view of evolution which is now commonly accepted. It is plain he accepts evolution, but it does not appear that he sees how fatal his theory is to any view of evolution except a teleological one—the purpose residing within the animal and not without it. There is, however, nothing in his lecture to indicate that he does not see this.' (ibid., pp. 95, 96.)

Butler is perhaps too optimistic, but how prone he was to read into Hering the theories which he himself held is obvious in a later passage where he declares :

' It is no strained conclusion to gather that he (Hering) holds the action of all living beings, from the moment of their conception to that of their fullest development, to be founded in volition and design, though these have been so long lost sight of that the work is now carried on, as it were, departmentally and in due course according to an official routine which can hardly now be departed from.' (ibid., p. 226.)

In the sense in which Butler means it, it would be a very strained conclusion indeed.¹ For Butler there is no division between inorganic and organic matter.

¹ The following passage from his note-books referring to his attempt to explain the physics of memory, published in the *Quarterly Review*, III, No. 9, shows that Butler is not so guileless as he appears: 'I was

'We should endeavour to see the so-called inorganic as living, in respect of the qualities it has in common with the organic, rather than the organic as non-living in respect of the qualities it has in common with the inorganic.' (ibid., p. 275.) 'It is more coherent with our other ideas to start with every molecule as a living thing, and then deduce death as the break-up of an association or corporation, than to start with inanimate molecules and smuggle life into them; and that,

alarmed by the suggestion and fathered it upon Professor Hering, who never, that I can see, meant to say anything of the kind, but I forced my view upon him, as it were, taking hold of a sentence or two in his lecture, On Memory as a Universal Function of Organised Matter, and thus connected memory with vibrations.'

The following extracts from La Marck are of interest in relation to Hering and Butler:

'To try to determine how the agitations of the nervous fluid trace or engrave an idea on the organ of understanding, would be to court the risk of committing one of those numerous errors to which the imagination is liable; all that we can be sure of is that the fluid in question is the actual agent which traces and impresses the idea; that each kind of sensation gives a special agitation to this fluid and consequently causes it to impress equally special outlines upon an organ so soft and delicate and find its way into such narrow interstices and tiny cavities, that it can impress in their delicate walls traces more or less deep of every kind of movement by which it may be agitated.'

Using as illustration the memory of a building on fire, La Marck writes: 'This process must be due to the fact that our inner feeling sets our nervous fluid in motion, and drives it into our organ of intelligence over the outlines impressed by the sensation of the conflagration, and that the modification acquired by our nervous fluid in its movements, as it passes over these particular outlines, is promptly transmitted to our inner feeling and thereupon restores to clear consciousness the idea that we are seeking to recall; although the idea is less vivid than when the conflagration was actually taking place before our eyes.'

In dreams the nervous fluid is said to wander uncontrolled. In perfect sleep the inner feeling undergoes no 'emotion' and the individual is as though he did not exist, but in imperfect sleep owing to internal irritation the free part of the nervous fluid is agitated and flows where it may over the configurations, giving rise to dream images.

'Thus dreams disclose to us the mechanism of memory, just as memory teaches us the mechanism of ideas.' *Zoological Philosophy*, translated by H. Elliot, pp. 393, 395. The last extract would seem to show that this good office of dreams is not the discovery of the psycho-analyst.

therefore, what we call the inorganic world must be regarded as up to a certain point living and instinct, within certain limits, with consciousness, volition and power of concerted action. It is only late, however, that I have come to this opinion.' (ibid., p. 23.)

For Butler 'Life is that property of matter whereby it can remember—matter which can remember is living' (p. 272). With this view of life as something instinct within each atom, the doctrine of vibrations possessed for Butler a very special meaning.

'Assimilation is nothing else than the communication of its own rhythms from the assimilating to the assimilated substance, to the effacement of the vibrations or rhythms heretofore existing in this last.' (ibid., p. 86.) 'I would recommend the reader to see every atom in the universe as living and able to feel and to remember, but in a humble way. He must have life eternal as well as matter eternal; and the life and the matter must be joined together inseparably as body and soul to one another.' (ibid., p. 273.)

It is in this sense that he could say :

'Assimilation is nothing but the imbuing one thing with the memories of another.' (ibid., p. 87. cf. *Life and Habit*, p. 136.)

It would be impossible for Butler to believe that vibrations ceased to be and were subsequently revived. Their cessation would be the extinction of life and memory. It is not surprising that with these tenets in his mind Butler should try to amend his author's wording in conformity with his own meaning. It is doubtful how far Hering's paper will bear the interpretation thus put upon it. For Butler, mind and life are conterminous. Life is essentially teleological. Probably it is paragraphs such as those quoted which caused Dr. Semon to write : 'Butler's essay contains brilliant suggestions, but these are mixed with so much questionable matter, that the whole, compared with Hering's paper on the same subject, is rather a retrogression than an advance.' (ibid., p. 10.)

Butler indeed substantiates the conception of memory in biology, but he does so because, for him, life is the expression of spirit and the continuity of the past with the present is something more than the continuity of motions within the same mechanism. This pampsychoist teaching will be further developed in relation to the view of M. Bergson.

In the meantime we ask whether we must say with Prof. Ward,

‘The mnemonic theory will work for those who can accept a monadistic or pampsychoist interpretation of the beings that make up the world, who believe with Spinoza and Leibnitz that “all individual things are animated albeit in divers degrees”. But quite apart from difficulties of detail, I do not see how in principle it will work otherwise.’ (*Heredity and Memory*, p. 56.)

The need for an historical treatment is recognized by many modern writers who at the same time explicitly reject mechanism. For instance, Prof. J. A. Thomson writes :

‘Adaptation or purposiveness requires a historical explanation ; it is a super-mechanical concept. . . . More important than any question of terminology is a recognition of the deep difference between the inorganic and organic processes. In the former there are no alternatives ; every stage is the necessary outcome of its antecedents ; all is mechanically determined. In the latter there are alternatives (for one species may split into several) ; the organism is a genuine agent ; the mechanical categories are transcended.’ (*Hibbert Journal*, vol. x, pp. 120, 320.)

What indications can one find of a treatment which shall not be mechanistic, yet which, in its recognition of what Prof. Thomson calls historical explanation, shall not fall into the snares of pampsychoism ? We will look first within the realm of biology itself.

A modern writer who has made use of ‘historical’ explanation in biology is H. S. Jennings (*Behavior of the Lower Organisms*, 1906). An organism’s reaction to any stimulus

depends upon what Prof. Jennings terms its physiological state.

'The same organism in different physiological states reacts differently to the same stimuli. It is evident that the anatomical structure of the organism and the different physical or chemical action of the stimulating agents are not sufficient to account for the reactions. The varying physiological states of the animal are equally important factors. . . . We shall find much occasion to realize the importance of physiological states in determining behavior. . . . The present physiological state of an organism depends on its past history. . . . This statement we know is markedly true for the higher organisms. What a high organism does under certain conditions depends upon its experience : that is upon its past history.' (ibid., p. 178.)

Prof. Jennings would show that all behaviour displays selection, adaptation, regulation. How does memory enter into this adaptation and regulation? To appreciate the answer we must first notice Prof. Jennings's account of response to stimulation. The role of tropisms and stereotyped reflexes in animal behaviour is regarded by Prof. Jennings as limited ; he follows Bain and Spencer in believing in 'over-produced' movements as the response to stimulation. An organism does not reply to its environment by a simple reflex which is at once relevant to the situation. On the contrary, stimulation is followed by many and varied movements from which the successful movement is selected by a process of trial and error. It will be that movement which relieves the organism with respect to the stimulation in question. Such a field of varied reactions is in Prof. Jennings's view essential for the development of relevancy and precision in behaviour. Such being the general character of reaction to stimulation, a first step towards regulation in behaviour is reaction to representative stimuli, i.e. stimuli neither beneficial nor harmful in themselves but leading to benefit or injury later. In trying to account for such reactions Prof. Jennings has recourse to the Law of the Readier Resolution of Physiological States.

'The resolution of one physiological state into another becomes easier and more rapid after it has taken place a number of times.' (ibid., p. 291.)

Prof. Jennings illustrates this law by the behaviour of the stentor when subjected to injurious stimulation by carmine grains. The stentor is an infusorium found on decaying vegetable matter in ponds and resembling in its appearance a minute gramophone horn. The surface of the trumpet is covered with cilia, and those which fringe the trumpet mouth by their movement sweep water and its contents into the interior of the trumpet. When stimulated the stentor continues the motion of its cilia, but as the flow of carmine grains continues, it bends its stalk away from the stream. At a further spread of the current of carmine, it reverses the action of the cilia, sweeping away the water from its trumpet; if the flood of carmine still continues, the stentor telescopes its trumpet. Should this stimulation by carmine be repeated after an interval when the stentor has again expanded its trumpet, the stentor will *at once* contract into its tube. This reaction illustrates the Law of Readier Resolution. If we call the state when the carmine grains begin to operate A, A passes into B as the stentor bends on one side. B passes into C as the stentor reverses its cilia, and C into D when the stentor contracts into its tube stalk. With repetition the series A-B-C-D becomes A-D wherein the physiological states corresponding to B and C are passed through so rapidly that they produce no reaction, but are resolved at once into D. A is representative of B and C in that the organism reacts to A as if B and C with their reactions had taken place.

'If the law of the resolution of physiological states is actually operative throughout behavior the effect would be to make behavior depend on the result of the animal's own action. This would produce behavior that is regulatory, such as we actually find to exist.' (ibid., p. 298.)

Memory then denotes the potentiality of a physiological state

for change in a given direction. How is this potentiality interpreted? The question is not easy to answer from Prof. Jennings's book. We may be back at 'Mneme' in a new guise under the phrase 'a physiological state'. With reference to this experiment and to another wherein the stentor was stimulated by a jet of water Prof. Jennings says,

'The behavior of the stentor under the conditions given is evidently a special form of the selection of certain conditions through varied activities. . . . The organism 'tries' one method of action; if this fails, it tries another, till one succeeds. . . . Is the change in the behavior of stentor in accordance with its past history a phenomenon in any way similar in character to the learning of a higher organism? . . . The essential point seems to be that *after the experience* the organism reacts in a more effective way than before. . . . Stentor seems to vary its behavior only in accordance with the experience that either (1) the stimulus to which a strong reaction is at first given, does not really interfere with its activities, so that the reaction ceases; or (2) that the reaction already given is ineffective since the interference with its activities continues, so that another reaction is introduced.' (ibid., p. 178.)

To this passage Prof. Jennings appends this foot-note:

'It is to be noted that nothing is said in this statement as to the Stentor perceiving these relations. The statement attempts merely a formulation of the observed facts in such a way as to bring out their relation to what we observe in higher organisms.' (ibid., p. 178.)

We read further:

'There seems to be no difference in kind . . . between associative memory and other sorts; they are based on the same fundamental law. The existence of associative memory has often been considered a criterion of the existence of consciousness, but it is clear that the process underlying it is as readily conceivable in terms of matter and energy as are other physiological processes. Even in inorganic colloids, as we have seen, the properties depend on the past history of the colloid, and the way in which it has reached the condition in which it is now found. If this is conceivable in terms of matter and

energy, it is difficult to see why the law of the readier resolution of physiological states is not equally so.' (ibid., p. 334.) 'While possibly our statement of this law may not be entirely adequate, there would seem to be nothing implied by it that is specifically vital, in the sense that it differs in essential principle from the methods of action seen in the inorganic world.' (ibid., p. 334.)

This seems to be mechanism pure and undefiled. Yet if we look more closely at Prof. Jennings's account of reaction to stimuli and the resolution of physiological states, we become doubtful whether he succeeds in keeping within the limits he here prescribes. He hesitates to attribute consciousness to the lower organisms, but holds that the facts of behaviour suggest it.

'So far as objective evidence goes, there is no difference in kind, but a complete continuity between the behavior of the lower and of the higher organisms. . . . The writer is thoroughly convinced, after long study of the behavior of this organism, that if the *Amoeba* were a large animal, so as to come within the experience of human beings, its behavior would at once call forth the attribution to it of states of pleasure and pain, of hunger, desire, and the like, on precisely the same basis as we attribute these things to the dog.' (ibid., pp. 335, 356.)

In describing the behaviour of the flat worm *Planaria* Prof. Jennings writes,

'The different physiological conditions are determined largely by the history of the individual worm, so that in this sense its behavior may be said to depend on its experience.' (ibid., p. 253.)

What is implied by the word 'experience' here? (cf. the passage quoted from p. 178.)

Again, what is to be made of a 'successful movement', which is selected because it is successful in causing a cessation of the stimulation? It is said to relieve the organism from the stimulating condition. If the organism in question lacks

sentience, it 'experiences' neither the presence nor the absence of the stimulation; it is only some appraising critic who can attribute success or relief to the movements. Yet it is this very success and failure which is necessary for the description of what happens in the regulation of movement. Prof. Jennings repudiates the reflex theory of animal behaviour just because it has no place for the selection and regulation of response. He regards it as inadequate for a faithful account of animal behaviour. Everywhere he finds 'trial' movements. Can 'trial', 'success', and 'failure' be given a meaning without some attribution of sentient experience to the behaving organism? This is a crucial question.

Without 'overproduced movements', selection would have no scope, and without selection, the resolution of physiological states would in no wise serve the purposes of biological memory: the present response would not be a record of past success or past failure. We seem to have here the elements of a dilemma. On the one hand, Prof. Jennings's observations make him reject tropisms and reflexes as an inadequate basis for constructing an historical account of behaviour. On the other hand, his desire to be 'objective' in his methods leads him to avoid any overt attribution of consciousness to the organisms studied. Yet when he proceeds to argue from the comparison of the lower and higher organisms that since they behave alike, and the higher are conscious, therefore it is probable that the lower are conscious also, is he entirely free from the charge of *petitio principii*? Does the objective method which seeks to be historical, succeed in avoiding the horns of mechanism on the one hand and pampsychism on the other? The question is important in view of the claims of those who have taken over this method from biology with the intent of thereby refashioning psychology. They reverse Prof. Jennings's argument, claiming: Since they behave alike and the behaviour of the lower organism can be described

without the attribution of consciousness, therefore the behaviour of the higher can be similarly so described.

This new school of psychology must be considered in the next chapter.

II

MEMORY AND 'BEHAVIOURISM'

IN order to use the objective method in psychology and the objective method only, it is necessary to make psychology the study of man's responses to his environment.

The category consciousness with the subdivisions, knowing, feeling, striving, must disappear and be replaced by the single group of phenomena, bodily responses. The observer can distinguish between stimuli on the one hand and responses on the other, and thus the knowing, feeling, striving of the old psychology will give way to a relation between the body and the environment, or between one part of the body and another.

To the objection that such a psychology is another name for physiology, the reply is made that the response in which psychology is interested is always the response of the organism treated as an individual whole, even though the response be the response of some one organ, such as the eye.

It would be possible to raise at this point the question, for whom and in what sense is the organism a whole? But let us assume the observer and his understanding of an organism as a whole, neglecting any comment to the effect that introspection lies at the root of such comprehension.

Human responses can be classified in several ways. There are the overt responses involving the larger musculature, easily recognizable by the observer, and the responses which are made within the body itself. The latter are only revealed

to the observer who can penetrate the periphery or obtain indirect evidence of their presence through their connexion with responses which can be made overt ; e.g. changes in rhythm of respiration, in blood pressure, in rate of flow of secretion. Or again, there are the responses which are native to the organism, hereditary modes of response, and those which arise in the course of time, acquired responses. The objective method can obtain much information about the functioning of the human organism, and such information is of capital importance.

What concerns us, however, at the present moment is to see how the use of the objective method avoids any assumption of experience, avoids any reference to the life of a sentient being other than life that is expressible in terms of its bodily organs, and in particular, how far it can reinterpret such a term as 'memory'.

If we consider hereditary responses to situations of a given character, the first distinction that we light upon is the distinction between primary reflexes and what are termed 'conditioned reflexes'. The first class comprises the primary responses made by the organism to some given type of stimulus, the second comprises the same responses made by the organism to stimuli other than those to which the primary responses were originally made : e.g. in the case of a dog the watering of the mouth at the contact with food is a primary reflex, the same watering of the mouth at the sight of his dinner bowl is a conditioned reflex.

In his study of that complicated organism the human being, the behaviourist can make no headway without studying conditioned reflexes. Now what does a conditioned reflex imply ? If one is permitted to accompany such expressions as stimulation x , response y , with such phrases as experience of x , experience of y , then it is easy to say that the sight of the dinner bowl, eating the dinner, and the watering of the mouth have become integrated in experience, and that there-

fore the watering of the mouth is as well able to follow on the sight of the bowl as on the contact with the food. But if we drop all reference to experience, what is integration? We have not here, at least not at first sight, a case of Prof. Jennings's 'readier resolution of physiological states'. This is not a case of A leading to D, when originally it led to B, and B led to C, and C led to D. Here we start with a reflex, say, PQ, and find in its place RQ. What connexion for the organism has R with Q? It may be said R has always preceded it in time; whenever the response Q occurred the stimulation R had gone before. But is it claimed that antecedence as such establishes the relation between R and Q? If so, then of course Q stands in the same relation to all the diverse events happening in the nervous system at the moment prior to its own occurrence. But if this one event R is to have some special relation which none of the others have, then neither antecedence nor even regularity in such antecedence seems sufficient to establish it. If R in its relation to Q is tantamount to P, do we not need to suppose some common conditioning of the events? It seems very questionable whether a reference here to a common fund of nervous energy is a sufficient explanation in view of the many cases where antecedence or simultaneity of nervous events fails to give rise to any association between the events in question. Something more specific seems required; for instance, a theory that they participate in one and the same line of neural excitation; that when they are present, P and R are parts of the same total stimulation to which Q is the response. If we regard Q as an effect, then P and R are both causal conditions. Without some hypothesis as to a physical system of equivalence whereby participation in the same line of excitation acquires a causal significance, one fails to see how 'togetherness in time' or 'immediate sequence' can yield any explanation of a relation between R and Q. With such a hypothesis, however, we can bring the conditioned reflex

under Prof. Jennings's law of 'readier resolution'. Just as the original chain A-B-C-D becomes resolved into A-D, so an original RPQ becomes RQ. The presence of R in the primary reflex relation may be denied, but unless R be brought into the same system with P and Q its present relation to Q remains a mystery. Behaviourism may not have recourse to teleology.

The most important of man's hereditary responses are his emotions and instincts. For the Behaviourist these do not differ fundamentally in kind. The differentiation made by Prof. James will serve: 'The only distinction one may draw is that the reaction called emotional terminates in the subject's own body, whilst the reaction called instinctive is apt to go farther and enter into practical relations with the exciting object.' (James, *Text-book of Psychology*, p. 373.) Compare with this Prof. Watson's definition of emotion: 'An emotion is an hereditary "pattern reaction" involving profound changes in the bodily mechanism as a whole, but particularly in the visceral and glandular systems.' (*Psychology from the Standpoint of a Behaviourist*, p. 195.) It is the changes in the duct-glands and ductless glands that are of chief importance. The student, however, must beware of taking the Behaviourist's account of emotion as the equivalent of the Lange-James theory. It is the Lange-James theory minus any conscious experience of the changes. An observer can only get at the bodily changes as they are revealed directly or indirectly. He knows nothing of the difference between fear and anger save as a difference in situation and response. (See Prof. Watson's caution 'We use these terms which are current in psychology with a good deal of hesitation. The student is asked to find in them nothing which is not fully statable in terms of situation and response. p. 199.) Instinct is defined as 'an hereditary pattern reaction the separate elements of which are movements principally of the striped muscles. It might otherwise be expressed as a combination of explicit congenital responses unfolding

serially under appropriate stimulation.' (ibid., pp. 231, 232.) There is no room here for controversy as to the relation of instinct and intelligence. For the Behaviourist an instinctive response must be a reflex. A distinction might be made between a simple response to a situation and a group or pattern of responses, the term instinct being reserved for the latter, but in essence there can be no distinction between reflex action and instinct. The task of the Behaviourist is to describe the pattern, try to reduce it to its lowest terms, detect the salient features, or again determine the order in which the instincts show themselves. Both emotions and instincts give scope for the conditioned reflex and for inhibition. Emotions and instincts will be exhibited in situations which did not originally excite them, and will be inhibited on occasions where originally they arose. The reflexes will also show habituation, that is, a lowering of resistance will make the response more mechanical and reduce the requisite force of the stimulus. Habituation is purely physiological, and there is no question of learning or of memory. It must be carefully distinguished from 'habit', a word used by Prof. Watson for any acquired response; i. e. any response which is not part of the hereditary equipment, without any reference whatever to habituation, the stage where the response has become fixed or automatic through repetition. In the conditioned reflex the response was hereditary, though made in a situation other than that which originally evoked it. In acquired habit the response is new. It is said to be developed out of the instinctive repertoire. 'The new or learned element in habit is the tying together or integration of separate movements in such a way as to produce a new unitary activity.' (ibid., p. 272.) In order to study learning we will follow the account given by Prof. Watson of the acquisition of an explicit bodily habit: hand and eye co-ordination. It is the story of learning the response of grasping at a seen object and of conveying it to the mouth for sucking. The

unitary activity to be acquired is the execution of correct grasping movements at the sight of an object. Given anything in the hands, the conveyance of hands and object to the mouth may be regarded as a primary reflex. Systematic weekly tests were carried out on a baby girl, L., aged 80 days. The child sat on her mother's lap facing the experimenter who dangled before her a thick stick of red peppermint candy 'of the old-fashioned kind'. If the baby did not attempt to reach for the candy, it was always put in her mouth. In the early experiments no attempt to reach for it was made, and on the 94th day the candy was placed first in the left hand, then in the right. Directly it was placed in the right hand it was carried to the mouth. On the 122nd day there was still no evidence of reaching for the candy. It was then placed on the tongue and quickly taken away again, then held near the baby's face, whereupon the baby pursed her lips and made sucking movements, at the same time raising one hand. After a little while the candy was again dangled before the baby; now it was grasped at by the left hand while the lips were pursed. At the next advance of the candy it was grasped and put into the mouth. At a further trial another effort was made to grasp it, though without success. Next week, on the 129th day, after preliminary failure to fixate the dangling candy until it was brought near the eyes, the baby made an effort with the right hand, and when the candy was next swung towards her, she struck at it and pushed it from one hand to the other, 'finally worrying it into her mouth,' 'At the next trial' (on the same day) 'the right hand went slowly up and grasped the candy'. At a further trial the candy was again successfully conveyed to the mouth. In the following week, 136th day, 'the right hand started up immediately, grasped the candy and carried it to the mouth.' Time 8 seconds. (*ibid.*, pp. 275, 276.) We must notice in the first place that the experiments are made with candy. But this does not entitle us to assume straight away experiences

of sweetness, or to suppose that L. has any experience corresponding to 'nice', or any want or craving for such experience when the candy has once been sucked. All this is forbidden by the rules of the game. But nevertheless the experimenter presumably had some reason for choosing 'red peppermint candy of the old-fashioned kind', instead of, let us say, his office ruler, for the sucking operation. We notice in the second place that the candy was always put into the mouth by the experimenter if L. failed to reach for it. The consequences of having the candy in the mouth therefore are regarded as highly important. The presence of the object in the mouth will 'touch off' the sucking reflex. In accordance with the theory of conditioned reflexes we can see that with repetition the sight of the candy should be sufficient to touch off the reflex of sucking. But this will not give the whole story. Somehow or other we must connect together grasping movements and the sucking of the actual candy. It should be here that the special virtues of the candy come in. The sugar solution spread over the palate on sucking must have its response, whatever this may be. It must be something which in its turn can touch off seeking movements, belonging to that ill-defined group termed by Prof. Watson 'positive' tendencies. This group seems to include every movement by which the body advances towards an object. The hand movements come in as a 'seeking' response. (This title must not imply to the reader any experience of 'want' or any reference to something sought, unwarrantable conational and cognitional factors.) If we allow good luck to bring the hands and the candy together, and further allow the seeking to become a conditioned reflex, started by the sight of the candy instead of by the sugar solution, we shall have the story complete.

What we have unexplained is the fact that 'on the next trial there were no false movements in reaching. The right hand went slowly up and grasped the candy.' During the

interval between the trials something seems to have happened to the positive tendencies. As they are described, they are tendencies for a loose group of movements, only characterized by the fact that with reference to a given object (we cannot say with reference to that which excites them, because the object is only the remote cause) they are all of them 'toward' movements. Here on the 129th day we have one definite movement as the response. In Prof. Jennings's language one movement has been 'selected', the others rejected, and we are not told how.

If we look at Prof. Watson's account of what we may term a complementary habit, an avoiding habit, viz., the learning by a child to avoid grasping a candle flame, we should find a parallel story to the candy story. Here it is a 'nasty' object, just as there it was a 'nice' one, and as before the 'nastiness' must have nothing to do with the tale. The contact with the candle, like the sucking of the candy stick, sets up negative tendencies, withdrawal or avoidance responses, and as before by good luck such responses avoid the candle flame. Then we read: '178 days. Definite progress in avoidance was noted. When the candle was presented she reached out with her left hand, but only after an appreciable interval, during which she sucked her fingers. . . . On the final trial she would not reach for it, but looked at it and sucked her fingers.' (*ibid.*, p. 279.)

It is noticeable that psychologists who try to construct behaviour out of reflexes, or to build from a limited collection of instincts, fall back upon some group of non-specialized tendencies in their account of development. There are objections to such procedure. In the first place, such non-specialized tendencies are contradictory to the very conception of a reflex or an instinctive response, both of which should be responses to specific situations, if not specific responses; in the second place such general tendencies serve as smoke screens whereby something suspiciously like intelligence is

smuggled into the boat to take the helm. One welcomes, therefore, the frank discussion of learning given by Prof. Watson. He says habits start from the so-called random movements, from among which one group or combination is selected as the 'successful' response. All the other movements seem unnecessary, but they are only unnecessary from the point of view of the acquired habit, for the 'successful' movement was only arrived at with the help of these so-called unnecessary movements. The acquirement of a habit is a complicated process. The selection of the 'successful' group requires explanation. As attempted explanations of the selection Prof. Watson cites the following: The selected act is the last in a series of trials, and as the movement most recently exercised is the first to reappear in a new trial. The successful act is the only one performed each time, and so becomes prominent by repetition. The successful act brings heightened metabolism; conceivably the recently active factors are more affected by this than other parts of the system. Or again, the successful movements may receive reinforcement in virtue of the fact that the successful act produces an emotional situation, which in its turn involves increased glandular secretion, with the possible consequence of heightened metabolism in the recently active parts. In each of these explanations there is the attempt to find, as we tried to find in the case of the conditioned reflex, some link by which the successful response may enter into such causal relations with the stimulus as to ensure its reappearance on the repetition of the latter. The first two hypotheses do not seem to be borne out by the curves representing animal learning among the mammals. It is possible to make two rough generalizations about such curves: (1) In the early stages there is no steady progress, rapid success to-day may be followed by total failure to-morrow. This seems inconsistent with the first hypothesis. (2) In the later stages of learning there comes a point where a change in the character of the

response is marked, and after which, though failures may occur, the curve never resumes the characteristic vagaries of the early stages. Now this point is sometimes reached suddenly. Neither of the first two hypotheses seems to account for such a feature.¹

The last two hypotheses may be said to give a physiological equivalent for the epithet 'successful' which shall have nothing to do with end or with a spectator's view of success and failure. Success means that the machinery of the body receives an acceleration or, shall we say, a release from friction, which ensures that when the same stimulus is presented this response will be the one set going. Either of these hypotheses would explain the course of animal learning if we could adduce some further hypothesis to explain why acceleration appears to be present, or at least appears to effect an advance in learning, only on some occasions and not on others. As Prof. Watson himself says,

'It should again be emphasized that these are little more than speculations. The fact, however, that we must confess to no ready made explanation of this problem should detract in no way from our zeal in studying the other factors involved in habit formation.' (ibid., p. 295.)

¹ In this connexion the following extract from an article by Prof. Yerkes is interesting. The article describes a series of experiments on multiple-choice, wherein a monkey, Julius, faced by a row of open and closed compartments, has to select from among the open compartments the one leading to his food.

A series of correct first choices was obtained on 11 May (after 290 trials) greatly to the surprise of the experimenter, for no indication had previously appeared of this approaching solution of the problem. It seemed possible, however, that the successes were accidental, and it was anticipated that in a control series Julius would again make mistakes. But on the following day, 12 May, the presentation of the original series of ten settings, which, of course, differed radically from the settings used from 4 May to 11 May, was responded to promptly, readily, and without a single mistake. Julius had solved his problem suddenly and, in all probability, ideationally. ('Mental life in Monkeys and Apes,' *Journ. of Animal Behaviour*, vol. iii, p. 68.)

Certainly not, but in the meantime the Behaviourist cannot go on his way rejoicing in the plainness of his path. He can go nowhere without crossing this bridge of selection and rejection, and the bridge lies in a very dark hollow. He will have to cross such a bridge at each of the different levels of development. His entrance into the realm of organized 'implicit language habits', as he terms thought, depends on such a bridge, one of extreme delicacy. If the Behaviourist is to describe learning in terms of response to stimuli, response due to the make of the machine, an ever-altering machine, but one always altering in accordance with mechanical laws, we should say he must first re-define and re-describe general tendencies in such a way as to show that, although as a class they have a common characteristic which entitles them to be termed positive or negative, they are each specific to a certain stimulus. If he does not do this, he is ceasing to base his theory on reflexes. Secondly, he must show how out of the mass response to stimulation, which is none the less specific, in the sense that just that mass response is called out and no other, certain elements become the future response to the stimulation in question, while other features disappear. As things stand at present neither Prof. Jennings in biology, nor the Behaviourists in psychology, have succeeded in accounting either for regulation or for the purposiveness which Prof. J. A. Thomson required in an historical account of behaviour (ch. i, p. 21).

But let us follow the Behaviourist a little further on his path when he shall have emerged from the dark hollow. When 'habits' in Prof. Watson's sense have been established, the human animal is possessed of an 'embarras de richesse'. 'In adult life each single object or situation can call out more than one response. The sight of a dog can cause me to run and climb a tree or to whistle for it to come and be petted.' (ibid., p. 298.) This being so, the Behaviourist is again called upon to account for regulation. Why is there tree climbing

in place of whistling, or vice versa? He looks for 'determiners'. He can cite the recency or the frequency of the response. Recent or frequent tree climbing at the sight of a dog should account for the present response of tree climbing in place of whistling. There is also the co-operation of intra-organic conditions. Shaken nerves due to a recent motor-car accident may occasion tree climbing when a dog appears, whereas sound wind and limb will cause the same sight to be greeted with a whistle. Prof. Watson cites a more complicated 'determiner'. 'The act called out is likely to be the one which is most closely connected with the general setting of the situation as a whole.' For the Behaviourist *the situation as a whole* can only mean the situation as a totality of stimuli. There are two possibilities here, we may have to do with composition of causes, when each stimulus in the totality produces its own effect, the total result being the algebraic sum of all the separate effects. Such a situation will give a response which is of the nature of a compromise. A man who responds to the sight of an entering friend and to a swinging door by shooting out his arm to catch the door, diverting it several degrees to grasp his friend's hand, thereby missing both door and hand, would illustrate such a compromise. Should the stimulus either of the door or of the friend be much stronger than the other alternative, the behaviour may look like a determination towards one alternative only, but the influence of the other is to be seen in the awkwardness of the arrest of the door or of the hand grasp. This can hardly be the determination which Prof. Watson is discussing. We may have a second possibility, viz., a combination of causes producing a heteropathic effect, an effect different from that produced by any one stimulus and from the algebraic sum of the separate stimuli. Let us apply this in Prof. Watson's own illustration. He considers the effect of a man with a fiddle on a lively passenger on board an ocean liner. It is Sunday, but the passenger would have begun

to dance had he not previously heard his travelling companions denounce Sunday dancing. Instead of dancing, 'the sight of the man with the violin may lead merely to verbal railing against the blue laws enforced beyond the three-mile limit.' (ibid., p. 299.) This effect is not a compounding of dancing and the inhibition of dancing due to the stimuli (*a*) sight of a violin, (*b*) re-echo of the phrase, 'dancing will not be tolerated'. It is an entirely new activity, railing. Is it a heteropathic effect from the combined stimuli? Prof. Watson says, 'The situation as a whole envelops us and each object in that situation can call out for the time being only a narrowly appropriate and conventional type of act'. Now if this means that the total situation, over and above the stimuli of which it is composed, in some way or other works as a control stimulus, regulating the effects of the separate stimuli, then the conception is full of difficulty. Prof. Watson's language lays him open to suspicion. 'Appropriate' is a word which suggests that some mental significance attaches to the situation for somebody, either actor or spectator. The response is not a heteropathic effect in the sense in which a chemical effect is the outcome of all the factors present; it is somehow a regulated effect. We must leave it at that.

A further determiner is found in the emotional tension of the individual due to recent situations. The same difficulty will recur here if situation means anything more than totality of stimuli. If not, this determiner appears to be a special case of the intra-organic conditions co-operating with the extra-organic. Finally, Prof. Watson names as the most important determiners the life history of the individual, 'in the sense that his general and special training, illnesses, disappointments, hobbies, family training, and the like, develop within him definite attitudes, trends, or slants'. (ibid., p. 300.)

'Trends' and 'slants', if something in the structure of the organism, would explain why the individual invariably climbed a tree rather than whistled when he saw a dog, but

they could hardly explain why to-day he climbs and to-morrow whistles. In other words, they are not determiners in the required sense; variability in behaviour would need other determiners to explain the special manifestation on any given occasion.

Prof. Watson concludes, 'We thus see that although the possibility of varied response is almost unlimited, yet definite factors are always present which rationalize behaviour and give it a causal basis.' We see the fact, no doubt, but it is questionable whether the Behaviourist has made clear the history of the 'unlimited' variety, and still more whether he has manifested the factors which determine response on any given occasion.

The acquisition of habits or learning might be thought to exhaust the significance of the term memory for the Behaviourist. It would, if his use of the word ran parallel to that of the biologist. Prof. Watson, however, gives a special significance to the term which is extraordinary.

'Memory . . . is a general term to express the fact that after a period of no practice in certain habits—explicit bodily habits, implicit word habits—the function is not lost, but is retained as a part of the individual's organization, although it may, through disuse, have suffered greater or less impairment.' (ibid., p. 340.)

This definition brings us face to face with a difficulty which we have up to the present ignored, but which is fundamental to the whole procedure of the Behaviourist. The Behaviourist takes up the position that it is possible to view the world as made up of creatures responding to stimuli. His own study of creatures responding to stimuli should itself be for another Behaviourist just a response to the presence of these other creatures, unless indeed he sets up the cry, 'all the world is to be regarded as a mass of responding non-conscious organisms, except just me'. The Behaviourist claims the right to use his own intellectual equipment in the same way as any other

natural scientist. Now the physicist, the chemist, and the physiologist would claim that in their observations and inferences they do not attribute to objects qualities which are based on their own subjective experience. (The claim is perhaps not quite so valid as appears at first blush.) The Behaviourist designs to follow the example of these scientists, yet Prof. Watson's definition of memory would seem to attribute to the organism characteristics which are based on the memory experiences of the observer, and on his memory as consciousness of the past. Impairment or improvement of function in an individual implies a standard of reference, which standard of reference is ultimately the memory of the observer. It is one thing to say, 'there is less water flowing through this pipe than there was last week,' 'the number of muscular contractions per minute is more than on the last occasion,' and it is another thing to say, 'this function of the individual *X* is impaired'. In the latter statement *retention* is implied, and the impairment is expressed as a fact in the life story of an individual. The reader will remember that the feature which was said by Prof. Watson to differentiate psychology from physiology was just this treatment of the organism as a whole in relation to its environment. Now what supplies the paradigm for this life story of the organism as a whole, if not the conscious life story of the observer? It is only on the ground of his own memory integration of past and present that he is able to infer that 'a function is not lost but is retained as part of the individual's organization'. Prof. Watson, however, goes further. When we come to look at the illustration of recognition given by him we find ourselves transported from the position of observer to the standpoint of the conscious memory of the responding organism itself.

'Often a person confronts us whom we have not seen for some time; his face and figure are not sufficient to call out his name, but they are sufficient to reinstate our old attitude toward him and possibly many of our reactions. . . . Not until

voice, gesture, and old situations reinforce each other are all of the old reactions called out. We become integrated then with respect to this individual, the final group of activities being the words, 'Why of course, John Smith! We used to play baseball together at Jonesville High School.' (ibid., pp. 304, 305.)

In this illustration the integrating individual would seem to be aware of the fact, i. e. to be remembering in the ordinary acceptation of the term. It may be said that this is not intended, that what is meant is that the response made is such as would justify the observer in inferring integration of past and present responses. When an animal in a given situation responds more quickly or with greater agility than on a previous occasion, the observer infers integration of past and present responses; so here he need do no more, he need not infer consciousness. We have already argued in the previous chapter that the combination inferred is not a true integration of past and present, but simply a way of analysing or denominating the physiological conditions of the response in question. The words which are here supposed to complete the reunion can make no difference. If they are substitutes for activities (and Prof. Watson says that ultimately words are substitutes for arm, hand, and leg activities), they cannot represent any cognitional integration of past and present; they are not signs expressive of knowledge. Either, then, the words as activities convey no fact of true memory to the observer, or he reads into them a cognitional meaning on the basis of his own experience; with the result that he will then find himself attributing consciousness of the past to the observed organism. On the face of it, however, this example of recognition reads like a bit of old-fashioned introspective psychology with observer and observed united in one individual.

We have said that the biologist could give no true significance to the term memory as consciousness of the past, that to use it for engrams and physiological states present in

the organism was to misuse the term. One may question whether the term is not even more misused, abused, by the Behaviourist who forces it to straddle from the facts of biology to the facts of introspection. It is surely a case of a doctrine falling between two stools. Such a treatment of memory, so far from meeting the difficulties with which we were concerned in the last chapter, leaves us with the problems of both biology and psychology on our hands. Is it possible to maintain a point of view which shall neither, on the one hand, imply pampsychism, nor, on the other, ignore all reference to conscious experience?

An interesting attempt to hold such a standpoint is made by Prof. Lloyd Morgan, whom we quoted in the last chapter as regarding a mechanistic interpretation of facts as inadequate in biology. Prof. Lloyd Morgan would term his general doctrine Emergent Evolution; he tries to see the physical, chemical, biological, and psychological facts of science as stages in a hierarchy. The epithet 'emergent' is indicative of the view that a higher stage is not a 'resultant' of a lower. It is a creation which could not be predicated from any exhaustive knowledge of the lower. All inquiries as to what makes the higher stage emerge from the lower, Prof. Lloyd Morgan rules out as metaphysical. Science has to accept the given and study the correlations between the various orders of events.

What is to be recognized as psychical, and with what facts is the psychical correlated? In his address to the British Association, 1921, Prof. Lloyd Morgan distinguished four stages of emergence. First the Physical, then the Chemical, two stages with which we do not know that any psychical facts are correlated. Then thirdly, a stage denominated Vital, with which is correlated 'Affective Enjoyment', 'The Unconscious'. Fourthly, a Vital stage, with the lower form of which is correlated Perceptive Cognition, and with the higher, Reflective Judgement; the stage of Consciousness. How-

ever much then Prof. Lloyd Morgan is at one with the Behaviourists in striving 'to treat the phenomena of conscious experience as a naturalist treats the phenomena of organic life', he is not at one with them in ignoring 'consciousness'.

It is his interpretation of memory and the physiological facts with which he correlates it that are of interest here. Setting out from the reflex responses of an organism, at what point in its development does Prof. Lloyd Morgan regard consciousness as emerging, and what is the differentia? To find the answer to this question it is necessary to study in connexion with his address to the British Association the author's *Instinct and Experience*. This book arose out of a symposium, 'On the Relation of Instinct and Intelligence'; in it he gives the following definition of instinct:

'Such behaviour is, I conceive, a more or less complex organic or biological response to a more or less complex group of stimuli of external and internal origin, and it is, as such, wholly dependent on how the organism, and especially the nervous system and brain-centres, have been built through heredity, under that mode of racial preparation which we call biological evolution.' (*Instinct and Experience*, p. 5.)

He regards such a response as involving the organization of subcortical centres, a stage in advance of that shown by spinal reflexes. Is it correlated with a psychical event? It may be, in this wise, that the events in the subcortical centres have their consequences in the cortical centres. Although essentially the response is independent of these higher centres, yet when it is made, they are affected, and when the situation calling out the instinctive response is repeated, these higher centres will take a hand in the game. They will 'play down upon and control the lower nerve-centres'. When this happens, Prof. Lloyd Morgan would say that correlated with the cortical control there is consciousness.

The criteria of consciousness given in the address are

'Some measure of revival with expectancy, begotten of pre-

vious behaviour in a substantially similar situation. Consciousness is always a matter of the subsequent occasion, and always presupposes a precedent occasion. In other words it is the outcome of repetition ; and yet, paradoxically, when it comes it is something genuinely new. But this is the very hall mark of emergence.' (*Report of the Eighty-Ninth Meeting British Association*, 1921, p. 159.)

On the first occasion Prof. Lloyd Morgan would not predicate consciousness ; on the first occasion the instinctive response is 'enjoyed' (this is a term borrowed from Prof. Alexander but adapted to a wider range of events).

'We have . . . a biologically determined but orderly sequence affording successive modes of enjoyment *a, b, c, d*. So far the precedent occasion. On a subsequent occasion there is (*a*) as before in presentative form ; this is immediately given in sensory acquaintance. But (*b, c, d*) are also 'in mind' - immediately or in re-presentative guise, under revival, as what Prof. Stout calls 'meaning'. We have therefore (under an analogy) on the precedent occasion the notes *a, b, c, d*, struck in sequence. We have on the subsequent occasion (*b, c, d*), rung up by (*a*) through a mechanism (a bad word since the mechanical is superseded) provided psychically and neurally in the instrument. And when the notes (*a, b, c, d*) thus vibrate together they have the emergent quality of what one may speak of as the chord of consciousness.' (*ibid.*, p. 160.)

A higher stage of emergence will be that of reflective consciousness. 'It is to the reflective level that all interpretation and explanation properly belong.' (*ibid.*, p. 163.) Here there is a resynthesis of the syntheses formed at the perceptual level. Side by side with ascending re-integration we also have descending ; reflective syntheses when well established may sink back as habits to the perceptual level, and syntheses of the perceptual level may sink to the level of unconscious enjoyment. There is action and reaction between the levels. The question of retention comes in here. Whatever rises from the level of unconscious enjoyment to the conscious level is experienced as new.

'As new, there is no revival, no feeling of againness, no expectancy of what will next come based on the experience of what has come on like occasions; for there have been no like occasions in the course of individual life. And it gets all its reference to objects through its alliance with the conscious.' (ibid., p. 164.)

Prof. Lloyd Morgan repudiates the theory of memory-images as survivals of past enjoyment or past consciousness, 'stored in the unconscious'. 'There are no memory-images in existence save as correlated to an existent process of conscious remembering.' (ibid., p. 167.) Although this leaves the problem of retention unsolved, it lifts one clear of the danger of confusing a memory-image with a physiological state or with an engram. Memory is definitely recognized as a psychical process.

If then we consider Prof. Lloyd Morgan's general outlook in comparison with that of such a biologist as Prof. Jennings, what is the distinguishing feature? Undoubtedly this doctrine of the emergence of consciousness. Whereas an inclined plane would represent the systematized facts of animal behaviour for Prof. Jennings, for Prof. Lloyd Morgan the facts require a staircase arrangement. Prof. Lloyd Morgan can thereby avoid that slippery slope which leads to pampsychism or to mechanism. Can he also by his postulate of emergent consciousness bridge the gap which seemed to yawn for the Behaviourists between automatic reflexes and acquired habits?

Does Prof. Lloyd Morgan's presentation of facts make the emergence of consciousness a necessary stage in the evolution of behaviour? It is on this point that the old controversy on Instinct and Intelligence throws light. Forwardness of outlook, adaptability, profiting by the previous occasion, are to be the marks of consciousness. If, when a situation calling forth an instinctive response is repeated, an animal profits by his previous experience, the animal is conscious. Now Prof. Stout raised the crux of the whole matter by asking:

'When does the animal learn its lesson? Does the actual process of learning take place on the second occasion or on the

first? Plainly it takes place on the first and not on the second. On the second occasion the lesson is utilized: but in order to be utilized it must already have been learned.' ('Instinct and Intelligence': *British Journal of Psychology*, vol. iii, p. 238.)

It may seem at first sight as if in point of fact it were of little moment at what point one predicated consciousness, and that the issue between Prof. Lloyd Morgan and Prof. Stout is a verbal one, especially when Prof. Lloyd Morgan goes so far as to allow that even on the first occasion there may be cortical spread of disturbance owing to inherited dispositions. The difficulty, however, lies deeper. It is not one of date, but one as to the nature of psychical processes. So far as the present writer can see, Prof. Lloyd Morgan's unconscious enjoyment is not shown to stand in any essential relation to his conscious process of perception. The emergence of expectancy, of ability to profit, is a mystery. Perhaps it is, and that is all about it. But in that case why predicate a psychical process at the reflex level at all? Why not attribute the pertinence of conscious behaviour on the subsequent occasion to the build of the organism and leave it at that? In other words, why not follow Prof. Loeb or Prof. Watson? If the rejoinder is, 'But one must begin somewhere,' the retort is, 'Then make the beginning influence subsequent development'; and this I take it is just what Prof. Lloyd Morgan does not do.

Consider the illustration given of the so-called chord of consciousness. We have seen that the factors contributed by unconscious enjoyment have not the character of againness, but are fresh and new to the individual. How then can the past enjoyment of *b, c, d*, together with the present *a*, affect the anticipation of a coming *b, c, d*? The anticipation would seem to owe nothing to the past history of *b, c, d*, for on Prof. Lloyd Morgan's showing these members of the chord would be just the same, without that past history. In *Instinct and Experience* Prof. Lloyd Morgan writes:

'It appears to me that the very fact of the occurrence of re-presentation on the second occasion of the performance of what was, in the first instance, purely instinctive behaviour, suffices to explain quite naturally the new power of transcending the "blind and ignorant present". For these re-presentative factors—these "elements reproduced by association"—are on the second occasion present in experience just before they are, or may be, presentatively supplemented through actual behaviour. . . . A re-presentative factor, present in consciousness, anticipates, in temporal sequence, the occurrence of a like presentative factor.' (ibid., pp. 45, 46.)

The 'elements reproduced' might be seen to precede the behaviour by some spectator who could watch the whole sequence of occurrences, but how does such a fact of preceding necessitate an anticipatory attitude in the experient? The 'reproduced elements' do not bring their past history with them and a warning, 'mind, what has been will be'. The whole point for Prof. Lloyd Morgan is that there is no quality of 'has been' for the experient. To term these factors 're-presentative' is misleading. What could unconscious enjoyment re-present to conscious perception? The latter might just as well swim in out of the blue on the top of a purely physiological stage of evolution as emerge after an initiating stage of enjoyment. So long as the cortex played its part all would go well. Consider also Prof. Lloyd Morgan's comparison between the rapturous song of a blackcap and the inspired outpouring of a poet. He asks, 'Is this enjoyment dependent on that expression, or is the expression dependent on unconsciously integrated enjoyment?' (*Report of the Eighty-Ninth Meeting, British Association, 1921*, p. 166.) As regards the blackcap he replies:

'His song is primarily the outcome of the unconscious poise of a psychical system, correlated no doubt with a physiological poise. In that sense the expression in song depends on unconscious enjoyment—or, if it be preferred, the behaviour in song depends on the integrated life-process with which the unconscious enjoyment is correlated. . . . And what of the poet?

I think that he too may tell us that unconscious integration of the emotional order precedes the imagery in which it is expressed—that, as he may put it, "the poetic inspiration strives to find expression"—that the clothing in imagery depends on the prior affective integration as yet unconscious." (ibid., p. 166.)

Why should we not add here also, 'or if it be preferred, the behaviour in versifying depends on the integrated life-process with which unconscious enjoyment is correlated'? Prof. Lloyd Morgan has never shown us why we should not. He has never demonstrated that the affective integration really counts. The whole significance is found in the correlated cortical processes. It is not the *affective value* of a situation that is important for the poet, but the messages received from the subcortical centres by his cortex.

After all, then, have we found in the scheme of Emergent Evolution the point of view which we sought? I fear not. Past experience is a meaningless conception for a consciousness which emerges in the manner described by Prof. Lloyd Morgan, nor can such a consciousness furbish up the plain tale of the Behaviourist.

ADDENDUM TO CHAPTER II

Prof. Lloyd Morgan's Gifford Lectures, *Emergent Evolution*, were published after the whole of this essay was ready for the press. There is so much to appreciate in this lucid exposition of his philosophic position that the criticism in the above chapter may well seem captious. Yet the grounds of the criticism remain. The account of memory in Lectures 4, 5, and 6 shows no change in essentials. Prof. Lloyd Morgan's view of the nature of primitive consciousness is open to the same objection as before: it is incapable of bearing the superstructure that is built upon it. One cannot understand how the 'go' and 'intrinsic' relations of the higher levels of consciousness emerge from the primitive consciousness depicted.

Prof. Lloyd Morgan denies that primitive consciousness can have reference to anything beyond itself. In the old sense of 'representative perception' no doubt this is true. He holds that there can be no reference until there is revival of past experience. Primitive consciousness is treated as if it were wholly passive, as if sensory presentation were a complete psychosis. Of a chicken which has its first presentation of a rice grain, he says, 'The pecking response is coming but has not yet come.' (*Emergent Evolution*, p. 101.) If we assume that the chick's experience, its 'minding', to use the author's term, has in it no activity, nothing relative to the 'coming', we meet with the difficulty already discussed; viz., how can the response, when it comes, teach the chick anything? How can repetition of the situation *ad infinitum* improve matters? Can the click-clack of events in itself make 'click' refer to 'clack'? This is the real question. We have maintained that it cannot unless there is a forward thrust from 'click' to 'clack'. It is just this forward thrust which would constitute primitive reference, linking 'something beyond' to the 'this'.

By his answer to his question, 'Is there a stage in the individual development of an organism in which consciousness is eventually emergent, when there are sensory presentations that as yet carry no meaning? From the point of view of emergent evolution there is such a stage—one at which a behaviouristic interpretation of that which happens is adequate and sufficient even if we acknowledge psychical correlates' (*ibid.*, p. 100), Prof. Lloyd Morgan puts a spoke in the wheel of evolution which seems to me to render the further emergence of consciousness unintelligible. A similar difficulty confronts one in the doctrine of primary retention. How is memory to be reached from a primary retention for which there seems nothing but a physiological basis and physiological 'qualities'? In such retention there is no preparation for the 'go' and 'intrinsic' relations of memory. (cf. *ibid.*, § xxiii.)

The difficulty to me is that when, as here, Prof. Lloyd Morgan falls back upon physiological events as a basis for the characteristics of psychical events, he seems to require that the former shall occur in that 'specific' way which presupposes the psychical correlates. (cf. *ibid.*, p. 16.) Do we really get free from a circular argument? It is tempting to say, 'Yes, if the circle is replaced by a coiled spiral.' We are told that 'the whole physical system from bottom to top is also from top to bottom a psychical system'. That being so the transitions from level to level of the hierarchy need explanation from above as well as from below; 'the richer cannot adequately be interpreted in terms of the poorer'. (*ibid.*, p. 204.) Now in the case of primitive consciousness and primitive retention Prof. Lloyd Morgan cuts us off from the interpretation in terms of the richer, and in so far as he does this he breaks the spiral. We fail to understand how 'revival' can emerge from retention conceived as a purely physiological process of renewal.

III

HISTORICAL OUTLINE OF THE TREATMENT OF MEMORY BY PHILOSOPHICAL WRITERS FROM HOBBES TO SPENCER

MEMORY in philosophical psychology was treated primarily as a kind of knowledge requiring analysis and only secondarily as a way of knowing requiring explanation.

For understanding the present-day theories of memory it is worth while to look at the account of memory given by the line of British writers from Hobbes to Spencer. Although the purpose in view is psychological it is impossible to consider a writer's account of memory apart from his epistemology and general philosophic standpoint.

Strictly speaking, Thomas Hobbes does not belong to the Empirical School which was so influential in shaping psychology, but his psychology is empirical in character, and it is helpful to begin the survey with a statement of his views.

All science should be deduced from the study of the fundamental attributes of bodies: extension and motion. These then are the basis of all reality.

‘All which qualities called Sensible, are in the object that causeth them, . . . but divers motions; (for motion, produceth nothing but motion.) But their appearance to us is Fancy, the same waking, that dreaming.’ (*Leviathan*, 1651, pt. I, ch. 1.) ‘After the object is removed, or the eye shut, we still retain an image of the thing seen, though more obscure then when we see it. And this is it, the Latines call *Imagination*, from the image made in seeing; and apply the same, though improperly, to all the other senses. . . . Imagination therefore is nothing but *decaying sense*; and is found in men, and many other living Creatures, as well sleeping as waking. The decay of Sense in men waking, is not the decay of the motion made in sense; but an obscuring of it, in such manner, as the light of the Sun obscureth the light of the Stars; which stars do no less exercise their vertue by which they are visible, in the day, than in the night. . . . Any object being removed from our eyes, though the impression it made in us remain; yet other objects more present succeeding, and working on us, the Imagination of the past is obscured, and made weak; as the voice of a man is in the noise of the day. From whence it followeth, that the longer the time is, after the sight, or Sense of any object, the weaker is the Imagination. For the continual change of mans body, destroys in time the parts which in sense were moved.’ (*ibid.*, ch. 2.)

In contrasting memory with sense Hobbes uses the instance of a man’s remembrance of the houses of a foreign city. The traveller

‘cannot distinguish them so particularly in his mind as he did; some house or turning escaping him; yet is this to remember; when afterwards there escapeth him more particulars; this is also to remember but not so well. In process of time the city returneth but as a mass of buildings

onely, which is almost to have forgotten it. Seeing the remembrance is more or less as we find more or less obscurity, why may not we well think remembrance to be nothing else but the missing of parts?' (*Human Nature*, 1650, ch. 2.) 'For there is in memory something like that which happens in looking upon things at a great distance; in which as the small parts are not discerned by reason of their remoteness; so in memory, many accidents and places and parts of things, which were formerly perceived by sense, are by length of time decayed and lost.' (*Concerning Body*, ch. 25, § 9.)

All our knowledge of the external world, then, rests on the appearance of sensible qualities. Of the 'apparition' itself we have no explanation. It is carefully distinguished from the motions, either within or without the body, which constitute reality. Why motion which can produce nothing but motion should appear as colour or sound is a mystery. Similarly all the appearances known to man when he 'reads himself' are said to be in reality the motions of his body: movement of the sense organs, agitation of the inward parts, endeavour outward from the heart.

'As, in Sense . . . so, when the action of the same object is continued from the Eyes, Ears, and other organs to the Heart; the reale effect there is nothing but Motion, or Endeavour; which consisteth in Appetite, or Aversion, to, or from the object moving. But the apparence, or sense of that motion, is that we either call Delight, or Trouble of Mind.' (*Leviathan*, pt. I, ch. 6.)

We thus have an epistemology which is subjective in that it regards the qualities predicated of both the inner and the outer world as depending on a sentient subject. The knowledge yielded both by memory and by sense is knowledge of appearance as contrasted with reality. Sense and memory are on the same footing; their difference in value for knowledge is one of degree rather than of kind. The ground of both is the same motion in the body. Memory is a necessary consequence of sense. The scat of imagery and sensation will be the same. Of the action of stimuli on the body we

have no details except that they occasion a change in the flow of animal spirits.

‘When a body is once in motion, it moveth (unless something hinder it) eternally.’ By such a doctrine images do not recur; an image as motion persists whether we are aware of it or not. It may be obscured like the stars in the day-time by the pressure of other appearances, but it continues until it is replaced by other motion. When this occurs completely, forgetting is also complete. Memory finds its laws not in biology nor in chemistry but directly in the laws of dynamics and mechanics. It is dynamics which will explain why ideas persist, why one idea calls up another train.

‘Those motions that immediately succeeded one another in the Sense, continue also together after Sense: In so much as the former coming again to take place, and be praedominant, the latter followeth, by coherence of the matter moved, in such manner, as water upon a plain Table is drawn which way any one part of it is guided by the finger. But because in Sense, to one and the same thing perceived, sometimes one thing, sometimes another succeedeth, it comes to pass in time, that in the Imagining of any thing, there is no certainty what we shall Imagine next; Only this is certain, it shall be something that succeeded the same before, at one time or another.’ (*Leviathan*, pt. I, ch. 3.)

The small beginnings of motion, called endeavour of the heart, are important in those regulated trains of ideas which are the basis of science and which Hobbes contrasts with the wild ranging of the mind. Reminiscence is an example of a regulated train.

‘There is yet another kind of discursion beginning with the appetite to recovery of something lost, and proceeding from the present backward, from the thought of the place where we miss at, to the thought of the place whence we came last; and from the thought of that, . . . to the thought of the place before, till we have in our mind some place wherein we had the thing we miss: and this is called Reminiscence.’ (*Human Nature*, ch. 4, § 5.) ‘All

experience being . . . but remembrance, all knowledge is remembrance.' 'When a man hath so often observed like antecedents to be followed by like consequents that, whensoever he seeth the antecedent, he looketh again for the consequent, or when he seeth the consequent, maketh account that there hath been the like antecedent ; then he calleth both the antecedent and the consequent signs one of another, as clouds are signs of rain to come, and rain, of clouds past. This taking of signs by experience is that wherein men do ordinarily think.' (ibid., ch. 6, § 1, and ch. 4, § 10.)

For Hobbes, then, dynamics should be the explanation of thought. In thinking, as in memory, the train of ideas should occur ' by coherence of the matter moved '.

In distinguishing memory from fancy, in the sense of constructive imagination, he refers to memory as knowledge of the past, but this point is not stressed.

' Fancy and memory differ only in this, that memory supposeth the time past, which fancy doth not. In memory, the phantasms we consider as if they were worn out with time ; but in our fancy we consider them as they are ; which distinction is not in the things themselves, but of the considerations of the sentient.' (*Concerning Body*, 1656, ch. 25, § 9.)

In Hobbes we have what is in essence a materialistic theory of memory. It is consistent and reveals its own limitations.

In John Locke we find no such clear-cut or consistent treatment. All knowledge is said to rest on ideas derived from sense and from reflection, but the relation of ideas to reality is obscure.

' The next thing to be considered is, how bodies produce ideas in us ; and that is manifestly by impulse, the only way which we can conceive bodies to operate in. If then external objects be not united to our minds when they produce ideas therein and yet we perceive these original qualities in such of them as singly fall under our senses, it is evident that some motion must be thence continued by our nerves, or animal spirits, by some part of our bodies, to the brains or to the seat of sensation, there to produce in our minds the particular ideas we have of them.' (*Human Understanding*, 1690, Book

II, ch. 8, §§ 11, 12.) 'Qualities . . . in bodies are, first such as are utterly inseparable from the body, in what state soever it be ; and such as in all the alterations and changes it suffers, all the force can be used upon it, it constantly keeps and such as sense constantly finds in every particle of matter, which has bulk enough to be perceived ; and the mind finds inseparable from every particle of matter, though less than to make itself singly be perceived by our senses. . . . These I call original or primary qualities of body, which I think we may observe to produce simple ideas in us, viz. solidity, extensity, figure, motion or rest, and number.' (ibid., Book II, ch. 8, § 9.)

The secondary qualities of objects, colours, smells, tastes, and sounds,

'are in truth nothing in the objects themselves ; but powers to produce various sensations in us ; and depend upon those primary qualities, viz. bulk, figure, texture, and motion of parts. From whence I think it easy to draw this observation, that the ideas of primary qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves, but the ideas produced in us by these secondary have no resemblance of them at all.' (ibid., Book II, ch. 8, §§ 14, 15.)

Our ideas of sensation are 'apparitions' but apparitions of two varieties, the first like, the second unlike, reality. Our ideas of reflection are assumed to be immediately related to the realities they bring before the mind, and it is through these ideas we have an intuitive knowledge of our own existence.

'What perception is, everyone will know better by reflecting on what he does himself, when he sees, hears, feels, &c., or thinks than by any discourse of mine. Whoever reflects on what passes in his own mind cannot miss it.' 'In every act of sensation, reasoning or thinking, we are conscious to ourselves of our own being, and, in this matter come not short of the highest degree of certainty.' (ibid., Book II, ch. 9, § 2 ; Book IV, ch. 9, § 3.)

Locke has no one principle as a foundation for his psychology. As we see from the quotations, motion in the sense organ and

brain is used to explain ideas of sensation, but the operations of the mind itself are treated as causal in relation to the ideas of reflection. Locke's account of memory inevitably suffers from the difficulties which lie implicit in his account of the origin of our ideas, an account avowedly 'historical' but in fact analytical.

Locke recognizes two ways in which mind by the Faculty of Retention keeps the simple ideas received from sensation and reflection :—Contemplation 'keeping the idea which is brought into it for some time in view' ; Memory, 'the power to revive again those ideas which have disappeared or been laid out of sight.'

'Our ideas being nothing but actual perceptions of the mind, which cease to be anything when there is no perception of them, this laying up of our ideas in the repository of memory signifies no more but this, that the mind has a power in many cases to revive perception which it once had, with this additional perception annexed to them that it has had them before. And in this sense it is that our ideas are said to be in our memories, when indeed they are actually nowhere ; but only there is an ability in the mind when it will to revive them again, and as it were paint them anew on itself, though some more lively, and others more obscurely.' (*ibid.*, Book II, ch. 10, § 2.)

Here the conception of an idea as a persistent entity is repudiated. Yet in the same chapter Locke uses language which seems to reflect Hobbes's doctrine of memory as decaying sense, motion continuing until it is replaced. He compares our minds to tombs

'where though the brass and marble remain, yet the inscriptions are effaced by time, and the imagery moulders away. The pictures drawn in our minds are laid in fading colours ; and if not sometimes refreshed, vanish and disappear. How much the constitution of our bodies and the make of our animal spirits are concerned in this ; and whether the temper of the brain makes this difference, that in some it retains the characters drawn in it like marble, in others like freestone and in others little better than sand I shall not here inquire.' (*ibid.*,

Book II, ch. 10, § 5.) 'Custom settles habits of thinking in the understanding, as well as of determining in the will, and of motions in the body: all which seems to be but trains of motions in the animal spirits, which, once set a going, continue in the same steps they have been used to; which, by often treading, are worn into a smooth path, and the motion in it becomes easy, and as it were natural.' (ibid., Book II, ch. 33, § 6.)

The metaphor of a repository and that of a cabinet suggest persistent entities, as does also the following picture of the prison house of the mind.

'The mind very often sets itself on work in search of some hidden idea, and turns as it were the eye of the soul upon it; though sometimes too they start up in our minds of their own accord, and offer themselves to the understanding; and very often are roused or tumbled out of their dark cells into open daylight, by turbulent and tempestuous passions.' (ibid., Book II, ch. 10, § 7.)

The two lines of thought—viz., that wherein memory is a collective name denoting persistent vestiges of sense of which motions in the brain and animal spirits are the cause, and that wherein retention is an ability of mind to control and reproduce past experience, a memory idea being an actualization of such potentiality—are left unreconciled. In the same way the passivity of mind in the reception of simple ideas and its activity in creating complex ideas, in understanding and in willing, are by Locke left unrelated and unexplained.

It is consequential on this duality of treatment that the knowledge due to memory ideas occupies a more equivocal position in Locke than in Hobbes. Although it is 'next in degree to perception,'

'there is a manifest difference between the ideas laid up in my memory (over which, if they were there only, I should have constantly the same power to dispose of them, and lay them by at my pleasure), and those which force themselves upon me, and I cannot avoid having. . . . Besides there is nobody who doth not perceive the difference in himself between contem-

plating the sun as he hath an idea of it in his memory, and actually looking upon it : of which two, his perception is so distinct, that few of his ideas are more distinguishable one from another. And therefore he hath certain knowledge that they are not both memory, or actions of his mind, and fancies only within him ; but that actual seeing hath a cause without.' (ibid., Book IV, ch. 11, § 5.)

The ' consequence ' of ideas which for Hobbes was the pathway of knowledge becomes for Locke, under the title ' association of ideas ', the root of intellectual habits, and of prejudice and error.

' Ideas that in themselves are not of kin, come to be so united in some men's minds, that it is very hard to separate them. . . . This strong combination of ideas, not allied by nature, the mind makes in itself either voluntarily or by chance. . . . A musician used to any tune will find that, let it but once begin in his head, the ideas of the several notes of it will follow one another orderly in his understanding, without any care or attention as regularly as his fingers move orderly over the keys of the organ to play out the tune he had begun, though his unattentive thoughts be elsewhere a wandering. Whether the natural cause of these ideas be the motion of his animal spirits, I will not determine, how probable soever, by this instance, it appears to be so : but this may help us a little to conceive of intellectual habits, and of the tying together of ideas.' (ibid., Book II, ch. 33, §§ 5, 6.)

Locke makes a great advance on Hobbes in the detailed psychology of memory. Most important is his explicit statement that memory involves a consciousness of past experience. ' To remember is to perceive anything with memory or with a consciousness that it was perceived or known before '. (ibid., Book I, ch. 3, § 21.) He does not make use of this fact in his account of the origin of our idea of time, except by implication. For although Locke recognizes the subjective aspect of duration and sequence, he, as Dr. Ward puts it, ' hopelessly confuses time as perceived and time as conceived.'

Hobbes had drawn attention to the role of appetite in reminiscence; Locke notes the part played by attention, feeling, and repetition, in fixing ideas in memory. He distinguishes 'recollection' from remembrance; in the former, the idea is 'sought after by the mind and with pain and endeavour found'.

He considers briefly the qualities of a good and bad memory, the extent of human memory in comparison with that of the angels, who may be endowed with 'capacities to retain together, and constantly set before them, as in picture, all their past knowledge at once'.

With regard to the difference in character between memory ideas and perceptions Locke insists that we find as plain 'the difference between any idea revived in our mind by our own memory and actually coming into our minds by our senses, as we do between two distinct ideas'. (*ibid.*, Book IV, ch. 2, § 14.) This suggests that the difference in question is one of quality rather than of degree. Memory ideas may be faint, and when they are faded or tarnished by time they are obscure ideas, but such a characteristic is not essential. Memory ideas may be clear, 'such as the objects themselves from whence they were taken did or might in a well ordered sensation or perception, present them'. (*ibid.*, Book II, ch. 29, § 2.) In Locke we have the beginning of a critical study of memory as a way of knowing, side by side with the study of memory as knowledge, psychology blended with epistemology.

There is little to notice in Berkeley's philosophy that is of interest from the point of view of memory. Ideas of sense and ideas of memory are on the same footing in that neither are the effects of a material cause. The latter are entirely dependent on the spirit or thinking substance which perceives them, the former are less dependent in that they are excited by the will of another and more powerful Spirit. In comparison with the ideas of sense the ideas of memory are less strong, less orderly, less coherent. For Berkeley, as for

Hobbes, association is at one and the same time both a subjective psychological fact and an objective principle of knowledge, and, for Berkeley, the objectivity is guaranteed by his faith in the Divine Author of the Universe.

In the *Treatise of Human Nature* (1738) Hume tells us,

‘All the perceptions of the human mind resolve themselves into two distinct kinds, which I shall call impressions and ideas.’ (*Treatise of Human Nature*, Book I, pt. 1, § 1.) ‘Impressions may be divided into two kinds, those of sensation and those of reflection. The first arises in the soul originally, from unknown causes. The second is derived in great measure from our ideas, and in the following order. An impression first strikes upon the senses, and makes us perceive heat or cold, thirst or hunger, pleasure or pain, of some kind or other. Of this impression there is a copy taken by the mind, which remains after the impression ceases; and this we call an idea. This idea of pleasure or pain, when it returns upon the soul, produces the new impressions of desire and aversion, hope and fear, which may properly be called impressions of reflection, because derived from it. These again are copied by memory and imagination, and become ideas.’ (*ibid.*, Book I, pt. 1, § 2.)

This demarcation gives us very nearly the present day limitation of the term ‘idea’. The ideas of memory are ‘somewhat intermediate betwixt an impression and an idea’ (of imagination). The difference between an impression and its copy, a memory idea, is a difference in force or liveliness, and similarly the difference between memory and imagination is a difference in force and vivacity in solidity or firmness or steadiness.

‘Since therefore the imagination can represent all the same objects that the memory can offer to us, and since those faculties are only distinguished by the different feeling of the ideas they present, it may be proper to consider what is the nature of that feeling. And here I believe every one will readily agree with me, that the ideas of the memory are more strong and lively than those of the fancy.’ (*ibid.*, Book I, pt. 3, § 5.) ‘An opinion or belief is nothing but an idea that is different from a fiction, not in nature, or in order of its parts,

but in the manner of its being conceived.' (ibid., Book I, pt. 3, § 7.)

In the appendix Hume emphasizes this difference of feeling. Were it not for this feeling, there would be no difference between 'the mere reveries of imagination' and 'the most established truths founded on history and experience.'

'There is nothing but the feeling or sentiment to distinguish the one from the other. . . . We venture to recommend to the consideration of philosophers . . . whether this feeling be anything but a firmer conception or a faster hold, that we take of the object?' (ibid., Appendix.)

It is difficult to say how far this 'faster hold' establishes a difference in kind between impression and idea. Memory ideas preserve not only the original impressions but also their order.

'It is evident that the memory preserves the original form, in which its objects were presented, and that wherever we depart from it in recollecting anything, it proceeds from some defect or imperfection in the faculty.' (ibid., Book I, pt. 1, § 3.)

This preservation of the original order is contrasted with the association of imagination. Nevertheless there is 'a gentle force' which unites ideas together.

'The qualities, from which this association arises and by which the mind is, after this manner, conveyed from one idea to another, are three, viz. resemblance, contiguity in time or place, and cause and effect.' (ibid., Book I, pt. 1, § 4.)

In the *Inquiry Concerning Human Understanding* (1748) Hume applies these three principles of connexion to ideas of memory as well as to ideas of imagination. There is throughout the *Treatise* and the *Inquiry* confusion of thought with reference to *order*. The order of occurrence which memory reproduces should be the temporal sequence of subjective experience, but in expectation, regarded as the inverse of memory, the order of events contemplated by Hume is order regulated

by law and system, and it is only as so treated that 'customary' order can become explanatory of causal connexion. We have no explicit recognition of 'pastness' as an essential feature of memory. Speculations as to a material basis for ideas lie outside Hume's purpose. It is sufficient for empiricism to show the dependence of ideas upon impressions. They are thus, as Reid says, 'set adrift in the world without friend or connexion, without a rag to cover their nakedness.' There is a touch of contempt in the passage in which Hume refers to his neglect to support his account of the union among ideas with 'something specious and plausible'.

'It would have been easy to have made an imaginary dissection of the brain, and to have shown, why, upon our conception of any idea, the animal spirits run into all the contiguous traces, and rouse up the other ideas that are related to it. But though I have neglected any advantage, which I might have drawn from this topic in explaining the relations of ideas, I am afraid I must here have recourse to it, in order to account for the mistakes that arise from these relations. I shall therefore observe, that as the mind is endowed with a power of exciting any idea it pleases; whenever it dispatches the spirits into that region of the brain, in which the idea is placed; these spirits always excite the idea, when they run precisely in the proper traces, and rummage that cell, which belongs to the idea. But as their notion is seldom direct, and naturally turns to the one side or the other; for this reason the animal spirits, falling into the contiguous traces present other related ideas, in lieu of that which the mind desired at first to survey. This change we are not always sensible of; but continuing still the same train of thought, make use of the related idea, which is presented to us, and employ it in our reasoning, as if it were the same with what we demanded. This is the cause of many mistakes and sophisms in philosophy. (*ibid.*, Book I, pt. 2, § 5.)

In this picture, idea corresponds to something deposited in a cell which is revived by the flow of animal spirits to the cell in question. We have here a different conception from that of Hobbes: an idea is a *revival*, not a *survival*, of sense.

Hume endows animals with the same capacities for ideas and associations as men. Then, strangely enough, governed by the very principle which furnishes the modern behaviourist with his method, he makes the explanation of animal behaviour the touchstone for the theory of reason in man.

‘Beasts certainly never perceive any real connexion among objects. . . . It is therefore by means of custom alone that experience operates upon them. All this was sufficiently evident with respect to man. But with respect to beasts there cannot be the least suspicion of mistake ; which must be owned to be a strong confirmation, or rather an invincible proof of my system. . . . To consider the matter aright, reason is nothing but a wonderful and unintelligible instinct in our souls, which carries us along a certain train of ideas, and endows them with particular qualities, according to their particular situation and relations.’ (ibid., Book I, pt. 3, § 16.)

In the foregoing writers there has been no clear distinction between the study of memory ideas in respect of their value as items of knowledge (epistemology) and the study of memory ideas in respect to their origin and nature as mental facts (psychology). The first writer to put forth a comprehensive psychological theory in which epistemological considerations had little or no place, was David Hartley (*Observations on Man*, 1749). From sensation, simple pleasure and pain, and automatic movements Hartley attempts to construct all the array of complicated phenomena credited to the human mind. These are all due to the workings of association. The explanation of association is found by Hartley as by many of his successors in the entanglement of physiology and psychology.

‘The white medullary substance of the brain is also the immediate instrument by which ideas are presented to the mind : or, in other words, whatever changes are made in this substance, corresponding changes are made in our ideas ; and vice versa. External objects occasion, first in the nerves on which they are impressed, and then in the brain, vibrations of the small and, as one may say, infinitesimal medullary particles. Sensations, by being often repeated, leave certain

vestiges, types, or images of themselves, which may be called simple ideas of sensation. Simple ideas will run into complex ones, by means of association.' (*Observations on Man*, Props. 2, 4, 8, 12.)

What is of interest is the completeness of the theory of memory as persistence and the use made of this theory by later writers, notably by Erasmus Darwin. (Hence the influence of Hartley on Butler.) The following passage is worth comparison with the passage quoted (p. 20) from La Marck :

' If we admit vibrations of the medullary particles at all, we must conceive that some take place in the foetus in utero, both on account of the warmth in which it lies, of the pulsation of those considerable arteries, which pass through the medullary substance, and which consequently must compress and agitate it on every contraction of the heart. . . . Let these vibrations be called the *natural vibrations*. As soon as a child is born, external objects act upon it violently, and excite vibrations in the medullary substance, which differ from the natural ones, and from each other, in degree, kind, place, line of direction. . . . Representing now the natural vibrations by N and the praeternatural ones, from various objects, by A, B, C, &c., let us suppose the first object to impress the vibrations A, and then to be removed. It is evident from the nature of vibratory motions, that the medullary substance will not, immediately upon the removal of this object, return to its natural state, N, but will remain for a short space of time in the praeternatural state A, and pass gradually from A to N. Suppose the same object to be impressed again and again, for a sufficient number of times, and it seems to follow, that the medullary substance will be longer in passing from A to N, after the second impression than after the first, after the third impression than after the second, &c., till at last, it will not return into its original state of vibrations N at all, but remain in the praeternatural state A, after the vibrations have fallen to a diminutive pitch, their kind and place, or chief seat, and their line of direction continuing the same. This state may therefore be fitly denoted by A, and being now in place of the natural state N, it will be kept up by the heat of the medullary substance, and the pulsation of its arteries.' (*Observations on Man*, Prop. 9.)

'Memory was defined to be that faculty by which traces of sensation and idea recur, or are recalled, in the same order and proportion, accurately or nearly, as they were once presented. Now here we may observe, first that memory depends entirely or chiefly on the state of the brain. . . . Secondly, the rudiments of memory are laid in the perpetual recurring of the same impressions and clusters of impressions. . . . Thirdly, suppose now a person so far advanced in life that he has learnt all these rudiments, . . . let us ask how he can be able to remember or recollect a past fact, consisting . . . of one hundred such clusters as are called rudiments of memory. . . . We may observe that there are only a hundred links wanting in the chain; for he has already learnt considerable exactness in the subordinate circumstances of the one hundred clusters. . . . As the single impressions, which make the small clusters, are not combined together at hazard, but according to a general tenor in nature, so the clusters which make the facts succeed each other according to some general tenor likewise. Now this both lessens the number of varieties, and shows that the association between many of the clusters, or rudiments or one hundred links supposed to be wanting, is cemented already. . . . The recurrence of ideas will be attended with words; and these words from the great use and familiarity of language, will fix themselves strongly in the fancy and by so doing bring up the associated trains in the proper order, accurately or nearly.' (ibid., Prop. 90.)

What is important to notice is the reference to the control exercised on the course of associations by 'the general tenor in nature' and by language. There is, however, no inquiry into the source of the order attributed to this general tenor in nature nor any inquiry into the source of the orderly arrangement of words in language. The difference between memory and fancy is said to consist 'partly in the vividness of the clusters, partly, and principally, in the readiness and strength of the associations, by which they are cemented together'. (ibid., Prop. 90.)

The psychological survey of the facts of human experience which had its inception in Hartley finds its fulfilment in *The Analysis of the Phenomena of The Human Mind* (1829) by James

Mill. Here as in Hartley all the phenomena of the human mind are set forth as products or compounds due to association, and are traced back by analysis to simple elements of sensation and feelings of pleasure and pain. Hartley's physiology is abandoned, but it is difficult to say what takes its place.

'It is a known part of our constitution, that when our sensations cease, by the absence of their objects, something remains. . . . I have still a feeling, the consequence of the sensation, which though I can distinguish it from the sensation and treat it as not the sensation, but something different from the sensation, is yet more like the sensation than anything else can be; so like, that I call it a copy, an image of the sensation; sometimes a representation, or trace, of the sensation. Another name, by which we denote this trace, this copy, of the sensation, which remains after the sensation ceases, is idea. This is a very convenient name, and it is that by which the copies of the sensation thus described will be commonly denominated in the present work. The word idea, in this sense, will express no theory whatsoever; nothing but the bare fact, which is indisputable.' (*The Analysis of the Phenomena of the Human Mind*, ch. ii, pp. 51, 52.) 'Our ideas spring up, or exist, in the order in which the sensations existed, of which they are the copies. This is the general Law of the Association of Ideas.' (*ibid.*, p. 78.)

In Mill's treatment of memory, epistemology and psychology are once more combined. The following passage will exhibit the combination:

'There are two cases of memory. One is, when we remember sensations. The other is when we remember ideas. . . . What is it to remember anything I have seen? First there is the idea of it; and that idea brought into existence by association. But, in memory, there is not only the idea of the thing remembered; there is also the idea of my having seen it. . . . But what is it we are to understand by what I have called "the idea of my having seen the object"? This is a very complex idea. . . . It is easy to perceive two important elements; the idea of my present self, the remembering self; and the remembered or witnessing self. . . . What happens at the moment of memory? The mind runs back from that moment

to the moment of perception. . . . But "to run over a number of states of consciousness, called up by association", is but another way of saying that "we associate them"; and in this case we associate them so rapidly and so closely that they run as it were, into a single point of consciousness, to which the name memory is assigned. If this explanation of the case in which we remember sensations is understood, the explanation of the case in which we remember ideas cannot occasion much difficulty. . . . In this recollection there is first of all, the ideas, or simple conceptions of the objects and acts; and along with these ideas, and so closely combined as not to be separable, the idea of my having formerly had those same ideas. And this idea of my having formerly had those ideas, is a very complicated idea; including the idea of myself of the present moment remembering and that of myself of the past moment conceiving; and the whole series of the states of consciousness which intervened between myself remembering, and myself conceiving.' (ibid., ch. x, pp. 328-31.)

Now what is it that Mill is analysing here? Is it our conception of what a remembered idea implies or is it our experience when we remember? We have travelled a long way from the simplicity of Hobbes or Locke.

The difference between remembering the facts of our sense experience and remembering the ideas of our own invention, is regarded by Mill as a difference in the *kind of idea* remembered.

'A sensation is different from an idea, only because it is felt to be different; and being felt to be different and known to be different, are not two things, but one and the same thing. I have a sensation; I have an idea; if these two are distinguishable in the having, it is likely that the copy of the sensation should be distinguishable from the revival of the idea, when they are both brought up by association.' (ibid., ch. x, p. 334.)

The editorial notes by John Stuart Mill in his edition of his father's work give us his views on this point of epistemological importance. In the first place, although John Stuart Mill believed in the method of analysis which his father had

adopted, he explicitly recognized that the phenomena of the mind did not necessarily yield to reflective introspection the elements out of which they were compounded. He makes a distinction between the complex phenomena wherein there is 'composition of causes' and the complex phenomena which are 'cases of mental chemistry, in which it is proper to say that the simple ideas generate, rather than that they compose, the complex ones' (*Logic*, Book VI, ch. iv). He cannot accept James Mill's elaborate description of memory. 'Apart from the question whether we really do repeat in thought, however summarily, all this series, explaining memory by self seems very like explaining a thing by the thing. For what notion of self can we have, apart from memory?' (*Analysis of the Phenomena of the Human Mind*, note, p. 340.) Neither can he accept his father's method of differentiating between memory of our sense experience and memory of our fancies. When the idea has not had its origin in sense, e.g. the idea of the Shakespearean character Falstaff, the remembrance of this complex idea does not seem to him to differ from the remembered idea of sense experience, as an idea differs from sensation. 'My present thought of Falstaff seems to me not a *copy* but a *repetition* of the original idea.' (ibid., note to ch. ii.) 'The only difficulty about memory, when once the laws of association are understood, is the difference between it and imagination.' (ibid., note to ch. x.) For this difference Mill finds association quite inadequate as an explanation. Just as the difference between sensation and idea is ultimate, so is the difference between memory and imagination. It is this difference which lies at the basis of all belief. 'Belief, as I conceive, is more than an inseparable association. . . . The difference between belief and mere imagination, is the difference between recognizing something as a reality in nature, and regarding it as a mere thought of our own.' (ibid., note to ch. xi.)

It comes to this, then, that no analysis of the ideas involved

in memory will yield an ingredient which as such differentiates memory from imagination. The difference for John Stuart Mill is one of experiencing. With this conclusion we are getting away from a conceptual analysis of ideas as knowledge to a characterization of the process of knowing.

This distinction had already been made apparent in Thomas Reid's *Inquiry into the Principles of Common Sense* (1764). The term idea stands indifferently for both the operation of the mind in knowing and for the knowledge, but Reid bases his Philosophy of Common Sense on the differences in the nature of the operations rather than on the differences in the nature of the ideas as knowledge. Sensations are operations wherein there is a simple act of the mind which cannot be defined.

'Sensation and memory . . . are simple, original, and perfectly distinct operations of the mind, and both of them are original principles of belief. Imagination is distinct from both, but there is no principle of belief.' 'Sensation implies the present existence of its objects ; memory its past existence ; but imagination views its object naked, and without any belief of its existence or non-existence, and is therefore what the schools call simple apprehension.' . . . 'I conclude also, that sensation, memory, and imagination, even where they have the same objects, are operations of a quite different nature, and perfectly distinguishable by those who are sound and sober. A man that is in danger of confounding them, is indeed to be pitied ; but whatever relief he may find from another art, he can find none from logic or metaphysic. I conclude farther, that it is no less a part of the human constitution, to believe the present existence of our sensations, and to believe the past existence of what we remember, than it is to believe that twice two make four. The evidence of sense, the evidence of memory, and the evidence of the necessary relations of things, are all distinct and original kinds of evidence, equally grounded on our constitution : none of them depends upon, or can be resolved into another. To reason against any of these kinds of evidence, is absurd ; nay to reason for them is absurd. They are first principles ; and such fall not within the province of Reason, but of Common Sense.' (ibid., ch. ii, §§ 3 & 5.)

One might comment that Hume said as much—and realized that by so saying he proved nothing. This is true, but nevertheless Reid looks at the matter in a new light. We saw that for Hume belief was an affair of vividness and peculiar feeling, peculiar hold on the object, yet the ground of this difference between memory and imagination was looked for in the character of the idea, not in the operation of the mind as something distinguishable from the idea known. For Reid, on the other hand, the difference lies wholly in the operations of the mind which are distinguished from the idea as object known. Reid by stressing the operations of the mind in abstraction from the object known and by postulating the presence of belief in sensation and memory, is able, to his own satisfaction, to identify the object of sensation and memory with the object in the real world as understood by common sense.

‘ In the meantime, I beg leave to think with the vulgar, that when I remember the smell of the tuberose, that very sensation which I had yesterday, and which has now no more any existence, is the immediate object of my memory ; and when I imagine it present, the sensation itself, and not any idea of it is the object of my imagination. But though the object of my sensation, memory, and imagination, be in this case the same, yet these acts or operations of the mind are as different, and as easily distinguishable, as smell, taste, and sound. . . . There is a smell, is the immediate testimony of sense ; there was a smell is the immediate testimony of memory.’ (ibid., ch. ii, § 3.)

Here we catch sight of the aspect of the memory problem which is so much to the fore in the epistemology and psychology of the present time. But ‘ sufficient unto the day is the evil thereof ’.

Alexander Bain is the direct follower of James Mill both in time and in thought. The first edition of *The Senses and the Intellect* appeared in 1855, the fourth and last in 1894. The corresponding editions of *The Emotions and the Will*

appeared in 1859 and 1899. In the preface to the first edition of *The Senses and the Intellect* he writes, 'The exposition proceeds entirely on the Laws of Association.' Human intellect is credited with three fundamental attributes: discrimination (the consciousness of difference), retentiveness, and the consciousness of agreement. Once set going upon the raw material of sensation, simple movements, and spontaneous movements, these attributes of intellect will provide all the phenomena of human mind in accordance with the laws of association. This is demonstrated by the systematic survey of the phenomena of cognition, of the emotions and of the will. Herein a true psychological interest has replaced the epistemological one, but the influence of the latter is still to be seen in the general conception of method. The diverse and complex furniture of the mind is reduced to its lowest terms by the same method of analysis as would be used to lay bare the epistemological value of an idea, and the subsequent exposition is a reconstruction of mental contents in accordance with the Laws of Association. At the same time evidence of the new influence of the biological sciences is not lacking.

'However imperfect may be the first attempt to construct a Natural History of the Feelings, upon the basis of a uniform descriptive method, the subject of Mind cannot attain a high scientific character until some progress has been made towards the accomplishment of this object.' (Preface to first edition.)

The later editions of *The Emotions and the Will* show the influence of biology more clearly than those of *The Senses and the Intellect*. There is an attempt to trace the growth and development of the emotions and a discussion of the conditions of their evolution though inheritance. For Bain the relation between mind and body is one of co-ordination.

'No fact in our constitution can be considered more certain than this, that the brain is the chief organ of mind, and has mind as its principal function.' (*Senses and Intellect*, fourth edition, p. 11.)

By retentiveness Bain means both the temporary persistence of a sensory impression after the withdrawal of the stimulus and the coherence of actions, sensations, and states of feeling occurring together or in close succession, 'in such a way that, when any one of them is afterwards presented to the mind, the others are apt to be brought up in idea.' This is the Law of Contiguity, which is said to be the basis of all memory, habit, and acquired power. The law thus not only stands for the tie between items of experience, which tie presupposes retentiveness of the experiences, but it also includes the fact of retentiveness itself.

The seat of the sensation and of the image are regarded as the same, a physiological doctrine which supports the theory that the two differ in degree not in kind.

'The old notion supposes that the brain is a sort of receptacle of the impressions of sense, where they lie stored up in a chamber quite apart from the recipient apparatus, to be manifested again to the mind when the occasion calls. . . . The idea of a cerebral closet shut off, is quite incompatible with the real manner of the working of nerve. Since, then, a sensation, in the first instance, diffuses nerve currents through the interior of the brain outwards to the organs of expression and movement—the persistence of that sensation after the outward exciting cause is withdrawn can be a continuance of the same diffusive currents, perhaps less intense but not otherwise different. . . . Now if this be the case with impressions persisting when the cause has ceased, what view are we to adopt concerning impressions reproduced by mental causes alone, or without the aid of the original, as in ordinary recollection? . . . There is only one answer that seems admissible. The renewed feeling occupies the very same parts, and in the very same manner, as the original feeling, and no other parts, nor in any other assignable manner.' (ibid., pp. 355, 356.)

Presumably Bain, like his predecessors—and, one may add, his successors—finds the explanation of association and revival in physiology. The Law of Contiguity is an axiom for Psychology, as is also the Law of Similarity: 'Present actions, sensa-

tions, thoughts or emotions, tend to revive their like among previous impressions, or states.' For Bain consciousness of likeness and consciousness of difference presuppose a supply of discrete items brought before the mind by the play of association or by the course of events in the external world. Yet by the Law of Similarity 'likeness' is treated as the occasion for the presence in consciousness of that which logically the consciousness of likeness may be said to presuppose. Can that which is treated as a condition for the appearance of previous experience in consciousness be also regarded as a cognitional relation between items of experience? This is a point to which the criticism of later writers, and in particular that of Prof. Ward, was directed.

In the detailed treatment of memory Bain is in advance of any of his predecessors. He discusses the influence of age, fatigue, and repetition on retentiveness, and he considers the differentiae of sensations and ideas. They are said to differ in force, vividness, intensity; the one is a strong effect, the other a weak. He suggests that

'In cases where a sensation has physical consequences, we might measure, from the physical side, the comparative strength of the sensation and the idea. Thus the contact of food with the tongue and cheek causes a flow of saliva; so does the idea or anticipation. But the flow under the sensation is at least several times greater than the flow under the idea.' (*Emotions and Will*, p. 565.)

In view of Pavlov's experiments this is an interesting suggestion. Ideas are said to differ from sensations in lack of detail, lack of steadiness; further they are less able to hold the mind's regard and exclude other states. They are in fact for Bain comparable to weak sensations.

Bain agrees with James Mill, in opposition to John Stuart Mill, that the difference between memory and imagination can be shown by an analysis of content known.

'The principal distinction between Memory and Imagination

lies in the setting of the respective ideas. Ideas of Memory have a place in the continuous chain of our remembered life : ideas of Imagination correspond to nothing in that chain, or rather, they are consciously combined from different ideas of Memory taken out of their Memory setting, and aggregated under a special motive.' (ibid., p. 534.)

Bain, however, emphasized the importance of volition in Belief. Indeed, he wrote in his earlier editions as if Belief itself were a special form of volition, not derivable from either emotional or intellectual consciousness. Preparedness to act on what we affirm is the mark of Belief. Bain credits the human mind with a primitive credulity. Ideas have a tendency to become sensations. This is of course true in a literal sense for ideas of movement ; Bain regards it as true of all ideas, and, although experience educates this primitive credulity, the ideas brought before the mind by retentiveness working under the Law of Contiguity will retain their bias to sense validity. This is in effect Bain's solution of the problem of why Belief is present in memory but may be absent in imagination. It is on the lines of James Mill's and is in keeping with the analysis of the difference between memory and imagination ; it is, in a word, consistent with Associationism.

Biological conceptions dominate Psychology in Herbert Spencer's *Principles of Psychology*, which was published in the same year as Bain's *Senses and Intellect*. His psychology is part of an evolutionary system of philosophy. In the gradual evolution of life the psychical is differentiated from the physical, but the two function as one in that ' continuous adjustment of internal relations to external relations ' wherein life consists. Instinct and memory represent two stages of development ; that is, stages in the organization of correspondence between organism and environment. Instinct stands for the co-ordinated reflexes established by accumulated experiences ; memory, for varying connexions met with in the course of experience.

'Let it be granted that the more frequently psychical states occur in a certain order, the stronger becomes their tendency to cohere in that order, until they at last become inseparable; let it be granted that this tendency is, in however slight a degree, inherited, so that if the experiences remain the same each successive generation bequeaths a somewhat increased tendency; and it follows that there must eventually result an automatic connexion of nervous actions, corresponding to the external relations perpetually experienced.' (*Principles of Psychology*, 3rd ed., pt. 4, ch. v, p. 439.)

'Instinct may be regarded as a kind of organized memory; on the other hand, memory may be regarded as a kind of incipient instinct.' (*ibid.*, ch. vi, p. 445.)¹

In the sphere of action, when the impressions serving as stimuli to special actions become complicated, automatic response is impossible. There is on the one hand a greater time requisite for the reception of the impression, this involves persistence, and further the complicated impression arouses more than one reflex response; these responses become nascent before the appropriate response to the particular set of stimuli is made.

'These nascent nervous excitements that conflict with one another, are really so many ideas of the motor changes which if stronger they would cause; or rather they are the objective side of those changes which are ideas on their subjective sides. Consequently, Memory necessarily comes into existence whenever automatic action is imperfect.' (*ibid.*, p. 448.)

In the sphere of knowledge,

'As the external groups of attributes and relations responded to become more complex, and by implication more infrequent, the answering physical changes become more loosely connected with one another and with the motor changes appropriate to them. . . . Most of these surrounding

¹ How far Spencer is here preaching the same doctrine as Butler is an open question. Butler asserts that prior to his own teaching Spencer did not recognize that the phenomena of heredity were phenomena of memory, and did not make memory the keystone of his system. (See *Luck, or Cunning?* ch. i, 1, 2.)

things, however, have no immediate relations to the needs of the organism—are not habitually followed by special motor changes; and therefore do not tend to excite motor changes. But while the clustered psychical states produced by the clustered properties of inanimate objects have usually no direct connexions with the actions, they have direct connexions with one another of all degrees of constancy; and, by consequence, have all degrees of the tendency to rouse one another. While the absolutely persistent relations among external attributes are responded to by inseparable relations of psychical states; the others, in their respective grades of persistence, are responded to by psychical states proportionate in their degrees of cohesion. Hence, of the impressions produced by adjacent objects during the movements of the organism, each is apt to make nascent certain other impressions with which it has been connected in experience—calls up ideas of such other impressions; that is, causes a remembrance of the attributes previously found in connexion with the perceived attributes. As these psychical states have in their turns been connected with others, they tend to arouse such others; and thus there arises that succession of ideas, partly regular, and partly irregular, which we call Memory—regular in so far as the connexions of external phenomena are regular, and irregular in so far as the groups of these phenomena occur irregularly in the environment.’ (ibid., pp. 449, 450.)

As soon as any connexions among psychical states through constant repetition become fixed and automatic, they cease to be part of memory. Common knowledge, such as that fire burns and the sun shines, are organizations which have ceased to be memory. It is thus that Spencer arrives at his ultimate test of the validity of any proposition, the ‘universal postulate’ behind which thought cannot go; viz., the inconceivability of the opposite. When a connexion has become fixed and automatic through repetition,

‘To assert the inconceivability of its negation is at the same time to assert the psychological necessity we are under of thinking it, and to give our logical justification for holding it to be unquestionable. (ibid., pt. 7, ch. xi, p. 407.) ‘Memory then pertains to that class of physical states which are in process of being organized.’ (ibid., pt. 4, ch. vi, p. 452.)

It is obvious that for Spencer the difference between sensation and image is one of degree merely, every image being a nascent sensation. The fundamental law in accordance with which one impression makes nascent other impressions is the law of association. It may be called the Law of Association by Similarity, but is in fact something quite different from the traditional law of that name. It is a law of assimilation, analogous to the process of biological assimilation, and logically is at variance with the whole doctrine of association as understood by James Mill. In Mill association was the name for the bond of connexion discoverable by an analysis of mental phenomena, but it was not the name for the event or process occasioning the reappearance of phenomena in consciousness; such reappearance was taken for granted as the consequence of this discoverable bond of association and of retentiveness. Bain tried to make the term cover both the cognitional relation and the revival process (cf. his definitions of the Law of Contiguity and the Law of Similarity). In Spencer Assimilation (Association by Similarity) is used definitely for the event which brings about the reappearance in consciousness of past experiences, while relations of likeness and difference between feelings are assumed as primary data. By adhering to association as the ground of the objectivity in knowledge and by trying to derive such validity from the psychological principles of assimilation and differentiation, Spencer makes evident the cleavage between the analytic laws of a theory of knowledge, and the explanatory principles of genetic psychology. He stands as the last representative of the old school. Or shall one say, as the first representative of the new?

In taking notice of the treatment of memory given by Thomas Reid, we broke in upon the line of the Associationist school and came upon a method of studying mental phenomena which set out, not from an analysis of knowledge, but from the conception of mind and its faculties. 'It must be by an

anatomy of the mind, that we can discover its powers and principles.' (*An Inquiry into the Human Mind*, ch. i, § 1.) 'Could we obtain a distinct and full history of all that had passed in the mind of a child, from the beginning of life and sensation, till it grows up to the use of reason; how its infant faculties began to work, and how they brought forth and ripened all the various notions, opinions, and sentiments, which we find in ourselves when we come to be capable of reflection; this would be a treasure of natural history, which would probably give more light into the human faculties than all the systems of philosophers about them since the beginning of the world.' (*ibid.*, p. 1, § 2.) Here there is recognition of the historical method in psychology. This is the method Locke had set out to follow but failed to pursue, and which Reid himself regards as an unattainable ideal. He contented himself with beginning with what he considers as the simplest of the operations of mind, sensation, and with the simplest form of this; viz., the sensation of smell. The effect of this method on his treatment of memory we have already considered. We will conclude this chapter with an account of two of Reid's successors; one of whom shows the influence of the Association school while the other stands outside it: Dr. Thomas Brown and Sir William Hamilton.

Brown sets out from the conception of consciousness as a stream of mental events, which he classifies into two groups corresponding to James Mill's Sensations and Ideas; viz., those which arise in the presence of external objects and those which arise 'in consequence of certain preceding affections of the mind'. The latter are subdivided into our intellectual states and our emotions. Of the intellectual states, he says,

'The whole order, as composed of feelings, which arise immediately, in consequence of certain former feelings of the mind, may be technically termed, in reference to these feelings which have induced them, Suggestions.' (*Lectures on the Philosophy of Human Mind*, 1820, Lecture XXXIII.)

Important for Brown is the distinction between the capacity of suggestion which occasions the procession of ideas in train and the power of detecting relations between members of the train as alike or different, &c. This finding of relations is a distinct function of mind.

'Without it there could be no continued meditation, but only a hurrying confusion of image after image, in wilder irregularity than in the wildest of our dreams.' (*Lectures on the Philosophy of Human Mind*, Lecture XL.)

'If we analyse our trains of intellectual thoughts . . . we shall find them to be composed of two very different sets of feelings—one set of which are mere conceptions or images of the past, that rise, image after image, in regular sequence, but simply in succession, without any feeling of relation necessarily involved—while the perception of the relation in the various objects of our thought, forms another set of feelings, of course as various as the relations perceived. . . . There is in short, in the mind a capacity of association ; or as, . . . I would rather term it—the capacity of Simple Suggestion, by which feelings formerly existing, are revived in consequence of the mere existence of other feelings, as there is also a capacity of feeling resemblance, difference, proportion, or relation in general, when two or more external objects, or two or more feelings of the mind itself, are considered by us—which mental capacity, in distinction from the former, I would term the capacity of Relative Suggestion, and of these simple and relative suggestions, the whole intellectual trains of thought are composed. (ibid., Lecture XXXIII.)

Here we have just the distinction which is lacking in Bain and the earlier writers on Association. Brown denies the existence of any mysterious bond between the suggesting and the suggested in simple suggestion. He speaks of the feelings arising 'spontaneously', or at least without the immediate presence of any known external cause. This implies a capacity in the mind for retaining, in a connected train, moments of consciousness which were immediately in sequence, and further it implies that which Spencer termed assimilation, or as Brown terms it 'the induction of any

past moment by the present moment'. Habit is an illustration of the mind's capacity for forming trains and retaining sequences. The capacity is nowhere fully discussed by Brown. Presumably it is based on the unity of consciousness. In his criticism of Hartley, Brown definitely rejects a physiological explanation of it. Brown's treatment of memory may be compared with that of James Mill. Memory is a complex, and reference to the past is emphasized as the feature which differentiates memory from simple suggestion.

'The remembrance is not a simple but a complex state of mind; and all which is necessary to reduce a remembrance to a mere conception, is to separate from it a part of the complexity—that part of it which constitutes the notion of a certain relation of antecedence. . . . The particular feeling of any moment before the present, as it rises again in our mind, would be a simple conception, if we did not think of it, either immediately or indirectly, in relation to some other feeling earlier or later. It becomes a remembrance when we combine with it this feeling of relation—the relation which constitutes our notion of time; for time, as far as we are capable of understanding it, or rather of feeling it, is nothing more than the varieties of this felt relation, which, in reference to one of the subjects of the relation, we distinguish by the word *before*, in reference to the other by the word *after*. It is a relation, I may remark, which we feel nearly in the same manner as we feel the relation which bodies bear to each other, as co-existing in space.' (ibid., Lecture XLI.)

Brown alone of the writers of this period considers the conditions determining the line of suggestion. Why should x induce y rather than z when both have been together with it in consciousness? Brown formulates these conditions under the title 'Secondary Laws of Suggestion', and they become important additions to the theory of memory. If once the unity of mind is accepted as the ground for the union of co-existing events (and Brown reduces immediate sequence to co-existence), then the varying degrees of strength in such union and the induction of *this* rather than *that*

become a definite problem in psychology. Brown did not furnish a key to that problem ; he may not even have formulated the problem to himself ; but the mere statement of the conditions or of the facts known concerning lines of suggestion is a great advance in psychological theory. No one point in Brown's psychology shows closer affinity with the subsequent teaching of Herbart than this.¹ The conditions enumerated by Brown as determining direction of suggestion are nine in number : the duration of the original feeling, the liveliness of the original feeling, its frequency, its recency, its freedom from other connexions, the bodily or mental temperament of the individual, his varying emotions, his varying bodily conditions, and lastly, his fixed habits.

In the psychology of Sir Willam Hamilton we see the influence of the continental writers, and particularly, so far as his treatment of memory is concerned, the influence of Leibnitz. Hamilton, like Reid, sets out from the consideration of consciousness. Consciousness is the *summum genus* of which the cognitive faculties, the capacities for pleasure and pain, and the exertive or conative faculties are species. But it is more than a collective name for these several faculties and capacities. It is the condition of their existence : knowing, feeling, desiring are possible only under the condition of being known.

' When I know, I must know that I know—when I feel, I must know that I feel—when I desire, I must know that I desire.' (*Lectures on Metaphysics and Logic*, 1811, Lecture IX, p. 192.) ' Consciousness is thus, on the one hand, the recognition by the mind or ego of its acts and affections ; in other words, the self affirmation that certain modifications are known by me, and that these modifications are mine. But, on the other hand, consciousness is not to be viewed as anything different from these modifications themselves, but is, in fact, the general condition of their existence, or of their existence within the sphere of intelligence. Though the simplest act of

¹ Cf. ' Herbart compared with the English Psychologists ', G. F. Stout, *Mind*, vol. xiv, 1889.

mind, consciousness thus expresses a relation subsisting between two terms. These terms are, on the one hand, an I, or Self, as the subject of certain modification, and, on the other, some modification, state, quality, affection or operation belonging to the subject. Consciousness, thus, in its simplicity necessarily involves three things, (1) a recognizing or knowing subject ; (2) a recognized or known modification ; and (3) a recognition or knowledge by the subject of the modification.' (ibid., vol. i, Lecture IX, p. 193.)

Consciousness is immediate cognition and implies memory.

' For without memory our mental states could not be held fast, compared, distinguished from each other, and referred to self. Without memory each indivisible, each infinitesimal moment in the mental succession would stand isolated from every other, would constitute, in fact, a separate existence.' (ibid., vol. i, Lecture XI, p. 205.)

We may find a present-day echo of this claim in M. Bergson. Hamilton gives the name Memory to one of the six faculties into which he divided cognition. He emphasises the fact that the faculties are not entities distinct from consciousness.

' It is the same simple substance which exerts every energy of every faculty, however various, and which is affected by every mode of every capacity, however opposite. . . . A faculty is nothing more than a general term for the capacity the mind has of originating a certain class of energies ; a capacity only, a general term for the susceptibility the mind has of being affected by a particular class of emotions.' (ibid., vol. ii, Lecture XX, pp. 2, 4.)

Of the six faculties : the presentative, the conservative, the reproductive, the representative, the elaborative, the regulative,—memory, in a broad sense, embraces three. As conservation or retention it is regarded as passive resistance, and is involved in the very conception of consciousness. In the act of knowing there is

' energy of the self-active power of a subject one and indivisible : consequently, a part of the ego must be detached or annihilated, if a cognition once existent be again extinguished.

Hence it is that the problem most difficult of solution is not, how a mental activity endures, but how it ever vanishes. . . . The solution of this problem is to be sought for in the theory of obscure or latent modification. The disappearance of internal energies from view of internal perception, does not warrant the conclusion, that they no longer exist ; for we are not always conscious of all the mental energies whose existence cannot be disallowed. Only the more vivid changes sufficiently affect our consciousness to become objects of its apprehension. . . . All the cognitions which we possess or have possessed, still remain to us—the whole complement of all our knowledge still lies in our memory ; but as new acquisitions are continually pressing in upon the old . . . the old cognitions, unless from time to time refreshed and brought forward, are driven back, and become gradually fainter and more obscure. . . . Every mental activity belongs to the one vital activity of mind in general ; it is, therefore, indivisibly bound up with it, and can neither be torn from, nor abolished in, it. But the mind is only capable, at any one moment, of exerting a certain quantity or degree of force. . . . Thus in proportion to the greater number of the activities in the mind, the less will be the proportion of force which will accrue to each. . . . Thus it is quite natural that the great proportion of our mental cognitions should have waxed too feeble to affect our internal perception with the competent intensity. . . . Thus is explained the phenomenon of Forgetfulness or Oblivion.' (ibid., vol. ii, Lecture XXX, pp. 212-14.)

To this theory of memory Hamilton annexes two observations.

' The first is that retention, memory, does not belong alone to the cognitive faculties, but that the same law extends in like manner over all the primary classes of the mental phenomena. It is not ideas, motions, cognitions, only, but feelings and conations, which are held fast, and which can therefore be again awakened. This fact of the conservation of our practical modifications is not indeed denied ; but psychologists usually so represent the matter, as if, when feelings or conations are retained in the mind, this takes place through the medium of the memory ; meaning by this, that we must, first of all, have had notions of these affections, which notions being preserved, they, when called to mind, do again awaken the modifications they represent. From the theory I have detailed to you, it must be

seen that there is no need of this intermediation of notions, but that we immediately retain feelings, volitions, and desires, no less than notions and cognitions, in as much as all the three classes of fundamental phenomena arise equally out of the vital manifestations of the same one and indivisible subject.' (ibid., vol. i, Lecture XXX, pp. 215, 216.)

His second observation is that attempts to explain memory by physiological hypotheses are unnecessary. Quoting from a German writer ¹ he says,

'They are at best but useless; for if the unity and self-activity of mind be not denied, it is manifest, that the mental activities, which have been once determined, must persist, and that these corporeal explanations are superfluous. Nor can it be argued that the limitations to which the Retentive, or rather the Reproductive Faculty is subjected in its energies in consequence of its bodily relations, prove the absolute dependence of memory on organization, and legitimate the explanation of this faculty by corporeal agencies.' (ibid., vol. ii, Lecture XXX, pp. 217, 218.)

Hamilton regards the differences between good and bad memories as depending more on the faculty of retention, conservation, than on the faculty of reproduction. By reproduction, a name which does not satisfy him, he means 'the process by which what is lying dormant in memory is awakened, as contradistinguished from the representation in consciousness of it as awakened'. (ibid., vol. ii, Lecture XXXI, p. 227.) 'The faculty of Reproduction is governed by the laws which regulate the Association of the mental train; or to speak more correctly, reproduction is nothing but the result of these laws.' He would bring not only

¹ Heinrich Schmid, Professor of Philosophy at Heidelberg, a disciple of Fries and a contemporary of Herbart. In animadverting on Hamilton's references to his writings, John Stuart Mill comments that his psychology is 'a choice specimen of a School of German metaphysicians who have remained several centuries behind the progress of philosophical inquiry, having never yet felt the influence of the Baconian reform'. *Examination of Sir William Hamilton's Philosophy*, p. 252.

thoughts but also feelings and conations under the laws of Association. The three Aristotelian laws of contiguity, resemblance, and contrariety are reduced to the two laws of simultaneity and resemblance or affinity. By the former

‘Objects co-existent or immediately consequent in time are associated; by the latter, things that stand in a mutual affinity to each other, either objectively and in themselves, or subjectively, through the modes under which the mind conceives them, are in like manner reciprocally suggestive. These laws are embraced by the Law of Redintegration, ‘according to which thoughts or mental activities having once formed parts of the same total thought or mental activity, tend ever after immediately to suggest each other.’ (ibid., vol. ii, Lecture XXXII, p. 239.)

Hamilton displays this law as a consequence of the conception of the unity of consciousness.

‘The various acts of minds must not be viewed as single, as isolated manifestations; they all belong to the one activity of the ego: and, consequently, if our various mental energies are only partial modifications of the same general activity, they must all be associated among themselves. . . . The force of every internal activity exists only in a certain limited degree; consequently, the excitation it determines has only likewise a certain limited power of expansion, and is continually losing in vigour in proportion to its eccentricity. Thus there are formed particular spheres of internal unity, within which the activities stand to each other in a closer relation of action and reaction to a single energy, in proportion as they gravitate more or less approximately to the same centre of action. . . . Thus the supreme law of association . . . is explained from the still more universal principle of the unity of all our mental energies in general.’ (ibid., vol. ii, Lecture XXXII, pp. 240, 241.)

No members of the train of thought can escape the law of association. If we fail to detect any bond between members in certain cases it is because the link of mediation is in the unconscious modifications of mind. Hamilton repudiates as absurd the suggestion made by his contemporary, Dugald

Stewart, that the mediate idea 'B' was actually in consciousness, but was then instantly forgotten, so that 'A' and 'C' appear as unassociated neighbouring moments in the stream.

Reproduction which takes place according to the 'general connexion' subsisting between the thoughts is termed spontaneous and is distinguished from the course followed by Reproduction when

'The act of volition, by concentrating attention upon a certain determinate class of associating circumstances, bestows on these circumstances an extraordinary vivacity, and consequently enables them to obtain the preponderance and exclusively to determine the succession of the intellectual train.' (ibid., vol. ii, Lecture XXXII, p. 247.)

This latter form of reproduction is termed Reminiscence or Recollection, a use of the term which may remind us of Hobbes.

Such recollection implies the discrimination of the reproduced from the original event and further the recognition of the reproduced as that which is required. We cannot seek in reminiscence something which is totally forgotten; some features of the totality which lies at the bottom of the association must be before the mind. The links within the whole may be of many different kinds, and the thought may travel in any direction over its associated ideas in search of the required recollection. It is some want or need which awakens the activity of the mind in reminiscence. (cf. Hobbes.) The activity once started will awaken not only the idea which satisfies the need but also other accessory ideas which act as a setting and colour the remembered idea. Only a certain number of these become objects of clear consciousness. Hamilton's observations in this connexion on the psychology of reading are fully in accord with recent experimental findings.

Reviewing Sir William Hamilton's teaching one may say that he advances on Brown by his definite recognition of the Unity of consciousness as the basis of union between ideas, further that he is more catholic in the interpretation of the alliances

for which such unity may be the basis, and thus can reach the Law of Redintegration, which is wider than any Law of Suggestion based on coexistence or immediate sequence in time. In this doctrine of the interplay of ideas there is a parallel to Herbartian teaching. But whereas Herbart treated ideas as forces, fusing with one another, opposing one another, complicating one another, Hamilton postulates an active subject, whose relation to the ideas which are themselves modifications of mind energy it is hard to determine. In this he has bequeathed a problem to writers of the present time.

In conclusion, let us sum up the questions which stand out in the psychology of these writers and which are the heritage of modern investigation:—In the older philosophers, the question of the relation of the memory image to the original of sense, the epistemological value of memory knowledge, the forms of relation between ideas and the epistemological value of such relations; in the Association school, the search for the elements and the fundamental laws of their connexion; and in the writers of the Scotch school, the conditions of suggestion and of obliviscence.

These writers accepted memory as it is for adult human consciousness without reference to anything simpler, in the sense of more primitive; further they accepted it as a fact to be described rather than explained. The parallelism between habit in action and memory in knowledge is not stressed and only in Spencer are the two brought together for common treatment. Memory is pre-eminently a matter of knowledge, not of conduct. But only here and there is the problem of memory as knowledge of the past made explicit. In Reid, the distinction is made between memory as an operation of the mind and memory as idea, in the sense of the object known by memory, but in the writers of the empirical and of the associationist school no parallel distinction is drawn between memory-image and memory idea, in the sense of an item of knowledge; they are used as synonymous expressions.

Looked at broadly, the method of all the writers of the Empirical English School is a method of dissection. They start by sorting out the known contents of adult mind; they analyse and classify them, pointing out their relations to one another, and take it for granted that the totality is the equivalent of human understanding, human nature, human mind. Fortunately, or unfortunately, it is items of knowledge which respond best to dissection. The faculties or powers of mind and the laws in accordance with which ideas are related will thus necessarily be just those which such an analysis of ideas requires. Reid and Hamilton, but particularly the latter, illustrate the opposite method; viz., the method of starting with a theory as to the nature of mind and its faculties, and deriving therefrom mental phenomena and the laws of their relations; thus Hamilton's psychology is deductive and more akin to the rational psychology of Wolff. Modern psychology has inherited all the problems of philosophical psychology, and in so far as she pursues them her methods must be the old methods, since in their essence these are exhaustive. She can only be more rigorous in their prosecution and more catholic in their combination. The modern titles, Experimental Psychology, Genetic Psychology, Comparative Psychology, indicate lines of procedure wherein the old empirical inductive and rational deductive methods are refined in application and extended in scope. Upon the old problems of philosophical psychology have been superposed problems from biology.

But when all is said and done, modern psychology may be seen to be fashioned by one school after the pattern of Hamilton, by another after the model of Hume. Here the unity of mind is stressed, there the plurality of contents proclaimed. The lines of division in method cross and recross as opposing philosophical ideals shape psychological theories. They may cross again as this one accepts biology and that one physics as the model of method and the gauge of progress.

IV

MEMORY AND NEW REALISM

WE considered the objective standpoint of the Behaviourist as arising out of the standpoint of the biologist, as being in fact an extension of biology into the field of psychology. But curiously enough this objective standpoint finds itself acclaimed by the epistemology of New Realism. The Realist has found it a fairly easy task to rewrite the psychology of sense-perception in such a way as to make it accord with his view of the cognitive relation, but the psychology of memory has proved rather intractable. Behaviourism, however, has supplied some branches of the school with exactly the psychology which their epistemology demanded.

The writers considered in our historical survey all made their study of memory with the mind qua 'knower' as the centre of their philosophic inquiry. The New Realist may be interested in memory as a kind of knowledge and in the relation of the image to the original of sense, but he makes his inquiry from an entirely different point of departure. Bain wrote, 'There is no possible knowledge of a world except in relation to our minds. . . . We are incapable even of discussing the existence of an independent material world ; the very act is a contradiction. We can speak only of a world presented to our minds.' This is just the position which the Realist denies. He denies the fatality of what has been illuminatively styled the 'ego-centric predicament'. From being the centre of the universe mind takes its place side by side with other finite existences. Within the whole of reality finites stand in various relations to one another. Mind's cognition of the material world is a relation, and instead of being the basis for all discussion of the nature of reality, is merely one among the many relations in which finites stand to one another.

In opposition to the theories based on the 'ego-centric

predicament' the Realist claims independence for whatever may enter into cognitive relation with mind.

'Realism does not deny that when *a* enters into a relation such as knowledge, of which it is independent, *a* now acquires that relation, and is accordingly different *by so much*; but denies only that this added relation is necessary to *a* as already constituted. Thus when *a* is known, it is *a* itself, as constituted without knowledge, that is, independently of that circumstance. The new complex known-*a* is of course dependent on knowledge as one of its parts.' (*The New Realism, A Realistic Theory of Independence*, R. B. Perry, p. 118.)

When mind is aware of a red patch, the relation between mind and the finite in question in no way affects the nature of that finite; we may not attribute any character to that finite in virtue of the relation except the character of being in the relation. The feature redness is independent of the relation, being known by mind.

We may regard the principles so far described as being fundamental for Realism generally. But Realism is not all of one pattern, and in relation to memory we must consider the parting of the ways. It is possible to take up the position that a complete account of the relationships constituting knowledge is in itself a complete account of mind. This is the form of Realism for which Behaviourism may be said to be the only psychology. But it is also possible to adopt the position that no account of the relationships of mind to other finites, however complete, can express the nature of mind. There remains as characteristic of mind something for which the word 'experience' is perhaps the best general term. This form of Realism leaves an opening for a study of mind which shall be in some sense subjective, but here again we find divergence of opinion as to the standing of the data for such a study.

We may look at the form of the memory problem in each of these varieties of Realism, taking Prof. Holt as typical of the first, and Prof. Alexander and Mr. Bertrand Russell

as typical of the second. It is more convenient to begin with the latter, and we will consider how memory knowledge is treated by Prof. Alexander.

In replying to a review of his Gifford Lectures by Mr. Broad (*Mind*, vol. xxx), Prof. Alexander expresses indignation with the critics who have paid attention to his theory of knowledge apart from his metaphysics. But since he himself tells us that he arrived at the larger task by examining the relation of mind to its objects, one may be pardoned for thinking that his theory of knowledge has significance in and for itself.

The cognitive relation is a relation of compresence between mind and its object. The simplest form of this relation will be the compresence of mind with what Prof. Alexander terms a *sensum*, say a patch of colour, a sound, a touch. The colour, sound, or touch is a real finite existent which is compresent with mind; the awareness of the colour, &c., is mind's act, its way of responding to the real. In perception mind's response is more complicated; it responds not only to a *sensum*, but to ideal elements. To understand the ideal elements it is necessary to turn to another thread of the theory; viz., the relation of body and mind. For Prof. Alexander the problem of mind and body is not to be solved by any theory of correlation or inter-action, wherein mental and neural processes are treated as two distinct series of events. For Prof. Alexander they are one. He sets forth a hierarchy of qualities which in general outline resembles the hierarchy of Prof. Lloyd Morgan (cf. ch. ii). The quality of consciousness is a new quality which 'emerges' in vital processes of a certain character; viz., in certain neural processes, just as vitality itself emerged with certain chemical processes. 'Neural processes which are not mental are not of the same neural order as those which are.' (*Space, Time and Deity*, vol. ii, p. 8.) A hypothetical physiologist within the brain, capable of observing all that took place therein,

might infer from the character of the processes whether they were conscious or not, but the quality of consciousness is directly revealed only to the brain's owner. This brings us to another doctrine peculiar to Prof. Alexander. The subject of the cognitive relation who is aware of the colour, &c., is said to '*contemplate*' the sensum, but to '*enjoy*' the conscious process which results from the compresence of sensum and mind. He enjoys his own acts of cognition. Consciousness, if we use the word to stand for the totality of the individual's conscious life, is made up of enjoyments. Whenever his neural apparatus, which operates as a great selecting agency, being capable of entering into relation with only certain other existents, is set in commotion of the right order, the subject is aware of x , the object which is in appropriate relation to the neural process, and further, he enjoys the act of cognition.

The only relation allowed between mind and its object is one of contemplation, a cognitional relation. Pleasure, its opposite, and the various emotions are cognitive relations, relations between mind and its own vital processes. Pleasantness and unpleasantness are of the same order as the organic and kinaesthetic sensa. All the mind's acts are conations. 'Cognition is nothing but the conation itself in so far as it is compresent with and refers to an object.' (ibid., vol. ii, p. 118.)

Now to return to the ideal elements in perception. When a yellow patch is in relation with the retinal apparatus and one is aware of an orange, the response, awareness of an orange, is the response to a sensum and to ideata. The neural process is not merely visual, but the neural processes of touching, tasting, smelling are also involved. The response made is appropriate to the compresence of mind and a particular object. The subject is aware of this orange. Similarly, if, in the absence of any sensa, the neural processes appropriate to given sensa are excited centrally as a consequence

of some mental act or through some vital process, the response will be, as before, awareness of the real object which originally called forth the neural processes. The object is the image, which is said to be real, non-mental. It is strictly parallel to the sensum. There is no room here for a difference in kind between sensum and image.

Now so far there is nothing which can be called memory. The only difference between the above and the Behaviourist's account of behaviour is that the response made to the presence of an object is not only a bodily act but also a mental act, awareness. This is, however, only a part of Prof. Alexander's doctrine. The object in sense perception and the object in memory and in constructive imagination are definitely non-mental and real. So far so good, but it is necessary to show that such images can have the characteristics of memory objects.

There are two features to be accounted for: the object known should be known as past, and further, as belonging to my past. The act of remembering is an act of appropriating. Prof. Alexander arrives at its features by comparing it with an act of expectation. The act is said to be a kind of desire directed backward. When this sort of act takes place in relation to an image, that image is taken up into the present and is remembered as *mine*. As regards its 'pastness', the image for Prof. Alexander is always the object, or at least a part of the object remembered, and it is declared to bear on its face the mark of the past. 'The object is com-present with mind as past.' 'The past . . . is revealed as past.' This is stated and is apparently regarded as a fact obvious to any one who has the experience of remembering.

What needs explaining in regard to both these features is the difference between revelations of the past and the images which, although they are known, are not past in the sense in which memory images are past. Prof. Alexander himself recognizes the existence of these images, quasi-

memories, as he terms them ; e.g. the picture of a man running or of a landscape which we call up on the basis of past sights of men running and of landscapes.

Prof. Alexander reminds us that ' we have not in memory itself any reference to the perceived.' (ibid., vol. i, p. 115.) Nor again are we in the position of the angel who is supposed to contemplate both our minds and the world to which the minds respond. In spite of the protest, however, it is possible that Prof. Alexander has allowed himself to occupy the position of the angel. His argument seems to run : The object really was past, therefore we know it as past ; whereas he admits, of course, that the second statement is our only warrant for the first. In his reply to Mr. Broad's comments (*Mind*, vol. xxx, pp. 25-39, and 129-50), Prof. Alexander says,

' I am accustomed to compare this apprehension of a real object when it is not present to the senses to turning round in order to see it. When the stimulus from the blood sets my enjoyment into the dog attitude, that is like turning me round to see the dog that is really present.' (*Mind*, vol. xxx, p. 425.)

Prof. Alexander recognizes that not every, may one say, *réchauffé* of the neural events concerned, turns him round to see a *past* dog. What then is the differentiating feature ? To repeat a comment which I made previously on this point :

' I may have exactly the same imagery when I remember my dog's welcome of last night and when I expect his welcome to-night.' (*Aristotelian Proceedings*, vol. xii, p. 214.)

Of course the organic sensations of the two moments may be different and the whole attitude of mind is different ; but the latter fact would throw us back on enjoyment as giving the essence of memory. In the same paper I raised the difficulty of understanding the relation of the mark of the past and the mark of the future, worn by images on their foreheads, to the acts of cognition. ' The images have the mark of the past or future, because of the conation involved in knowing

them. The conation is remembering or expecting because of the terminus a quo or ad quem.' Prof. Alexander replied,

'When I say that images have the mark of the past or the future because of the conation involved in knowing them, I mean only that because your mind moves in the two cases in the two different directions of enjoyment, the corresponding object appears to you as past or present. Barring illusion the object really is (i. e., non-mentally) past or present, but you are aware of it as such by means of the conation into which your mind is thrown for one reason or another in respect of the object.' (*Proceedings of Aristotelian Society*, vol. xii, p. 208.)

Now this reasoning seemed then, and seems still, circular; 'pastness' is tossed to and fro. The object really is past, therefore the appropriate act of conation has a given character. The act of conation has a given character, therefore the object is past. Underlying it all is the belief that the object 'really is past'. Dare one suggest that there is an unalaid ghost of representative perception hovering behind the passage quoted? But if our sole source of knowledge that the object is past lies in memory, then we must seek the clue in the character of the act of cognition, and as a matter of fact this is what in most cases Prof. Alexander would seem to do. Here we come upon the difficulty of Prof. Alexander's doctrine that we cannot *know* the character of an act of cognition, we can only enjoy it. Applied to memory and quasi-memory this means that we contemplate object x and we contemplate object y ; in the case of x we enjoy pastness, in the case of y , we do not. (cf. *Space, Time and Deity*, vol. i, p. 120.) This, however, gives us no warrant for saying that we contemplate x with a mark of the past upon it, or that we are compresent with an x bearing the mark of the past on its forehead. If we do say so, we are treating an enjoyed character of our own act of cognition as the guarantee for a character in x , but such attribution of a character to the object known falls outside the cognitive relation of compresence. Mind as a finite among other finites has no

prerogative to attribute features to these finites, on the ground of characteristics which it enjoys in its own emergent character of consciousness. Does Prof. Alexander abandon his own principles here? The road which was open to Reid is barred to the New Realist.

When we come to analyse 'the experience of remembering a past state or act of mind, as distinguished from the past object', the coil becomes more involved. There is the act of appropriating as in the case of the past object, but 'the image of a past state of mind' (whatever that expression may mean here), is not an object. It cannot be contemplated. The past enjoyment is *enjoyed as past*. One is forbidden to say that the past enjoyment is *renewed*. That, according to Prof. Alexander, would be to confuse the standpoint of the ideal spectator who could see that the enjoyment in question was 'now', or of the physiologist who could report on the actual neural events, with the standpoint of the experient. How then are we to think of the experient? Is he lost in the past? Apparently for Prof. Alexander he is. Doubtless this happens, but when it happens, is it true to say the experient is enjoying the past *as past*? This would be exactly where the ideal spectator or the angel would come in. He, and he alone, could affirm this. For the experient, on Prof. Alexander's view, there is no such relational character as the word 'past' implies, no consciousness of any latent contrast with the present environment, or present organic sensa. Yet Prof. Alexander says, 'the enjoyment has pastness written on its face.' (*Space, Time and Deity*, vol. i, p. 126.) If so, it would seem as if there must be some recognition of a difference between the two streams of enjoyment making up the totality of consciousness at the moment. Taking Prof. Alexander's example of the sight of a friend calling up the memory of hearing him say such and such a thing in the past, one would say that the enjoyment of the act of seeing the friend and the enjoyment of the hearing him say such and

such a thing should somehow or other be different for the experient, if one is present and the other is past. Is it enough to say they are enjoyed as different? Will not the difference in question need to be discerned, if it is to give significance to the statement, 'I remember hearing him say this and this'?

In the discussion already referred to, the present writer asked Prof. Alexander wherein lay the difference between the 'repetition' of an enjoyment and its 'renewal'—as he then styled enjoyment of the past as past, with the caveat however that it was not known as a renewal. E.g. 'I may be vexed again to-day at the memory of a mistake made yesterday. This, I take it, is repetition. I may remember my yesterday's vexation at the mistake which I then made. This, I suppose, is for Prof. Alexander renewal' (*Proceedings, Aristotelian Society*, vol. xii, p. 215). It would seem as though this question were being answered on p. 129 (*Space, Time and Deity*, vol. i) :

'So far as I can trust my own experience I believe we can observe a distinction between a remembered and a present emotion. I remember the feeling of shame felt at a social blunder, and the more vividly I represent the circumstances the more intense the emotional excitement becomes. Still all this personal experience is detained in attachment to the past object, and despite the urgency of the feelings I am lost in the past, and the whole experience, object side and subject side alike, has the mark of the past. But suddenly I may find myself arrested. I forget the past object and I become aware of the emotion as a present state. . . . I change from a past enjoyment to a present one. What the difference is I find hard to say; the pastness of the image seems to draw the feeling after it into the past as well. It may be that the whole difference lies in the compresence with a past object.'

Now leaving aside any difficulty as to a 'past object', this passage would seem to regard it as impossible to have a present enjoyment in relation to a past object. When the emotion is present the past object must be forgotten or must cease to be past. One questions whether this is a faithful picture of experience. Is it true that when one becomes

vividly aware of burning cheeks as a new wave of shame sweeps over one (let us assume for the moment that emotional experience is constituted by awareness of organic sensa), is it true that one forgets the social blunder? There may be a shift in focus relative to the object or objects as between the first and second part of the experience as described by Prof. Alexander, but surely the memory of the blunder persists? The absence of such a memory does not seem required by any tenet of the Lange-James theory of emotion, though, of course, one may say its presence is required by the opposing view of emotion as a subjective attitude towards an object. No, this view that we are lost in the past enjoyment when we remember our states of mind, and further that this past enjoyment is not revealed in the present, is not based on an appeal to experience, but is consequential on denying any knowledge to mind of its own states. There cannot be consciousness of the difference between past and present enjoyment revealed in the mind's present, because if there were, mind would be knowing itself, and that is forbidden.

Not only is the analysis of complex enjoyment a difficulty, but Prof. Alexander leaves no way open to the experient of retrospectively comparing one stretch of simple enjoyment with another, and of thus denominating one past, the other present. If one says the respective objects can be compared and in this way the stretches of enjoyment can also be compared, we get again into the old circle of past object, past enjoyment. Such a mind as Prof. Alexander describes would in fact remember whenever it was lost in its past; but, so far as one can see, only an angel would be aware of the fact.

We are thus forced to the conclusion that a finite mind as described by Prof. Alexander cannot know that it remembers its own past states and acts, though in fact it may do so; but, further, we maintain that since for Prof. Alexander the knowledge of past objects depends upon their appropriate enjoyment being recognizably different from the enjoyment

of present objects, mind cannot even know that it remembers past objects, though in fact it may do so. The psychology of memory is thus shifted from the human to the angelic plane.

By faith Prof. Alexander may save himself from the 'hateful day' of conversion to Behaviourism, but in the meantime he must dree his weird without psychologizing. He must enjoy his mental history without contemplating it—except now and again when he will delight and help us all by 'making a clean breast of his thought', forgetting that the only grammar of his mind is interjectional.

Mr. Bertrand Russell used to believe, like Prof. Alexander, in a mind which entered into relations with, shall one say, other finites. He believed also that these relations were experienced and that the experience could be known to introspection.

Memory was distinguished from awareness of an image as the awareness of a past object. The possibility of direct acquaintance with a past object was claimed on the basis of the phenomena of immediate memory, where the object given is identical in part at least with the object recently given in sense.

'Hence since immediate memory is intrinsically distinguishable from the sensation, it follows that it is a different relation between subject and object. We shall take it as a primitive constituent of experience. . . . It will be observed that to know a past object we only need immediate memory, but in order to know what is meant by 'past', an immediate remembering must be itself made an object of experience. Thus introspection is necessary in order to understand the meaning of 'past', because the only cases in which this relation is immediately given are cases in which one term is subject.' (*On Experience of Time*, Monist, 1915, p. 226.)

Mr. Russell thus avoided two of the difficulties we met with in Prof. Alexander's theory. 'Pastness' is a psychological notion, not a quality of non-mental objects, and it is known in introspection. Although Mr. Russell found a place for definite memories in his theory of knowledge, he had no place

for the influence of past experience on cognition in general. 'Learning by experience is a meaningless phrase with reference to the cognition Mr. Russell portrays.' (*Proceedings, Aristotelian Society*, vol. xvi, p. 179.) Now, however, with a frankness deeper rooted than that of Sganarelle Mr. Russell can declare: 'Oui, cela étoit autrefois ainsi; mais nous avons changé tout cela, et nous faisons maintenant la médecine d'une méthode toute nouvelle'. The result, on the whole, is to place Mr. Russell nearer to the school of Neutral Monism. Like Prof. Alexander he feels the attractiveness of Behaviourism and like him, though for different reasons, he is unable to accept it as an adequate psychology.

Mr. Russell has abandoned his belief in a knowing subject who in cognition enters into relation with an object. The theory of the compresence of mind and object with the ascription of an act of cognition to mind is regarded as untenable. It would seem that Mr. Russell is prepared to adopt the Behaviourist's view of knowledge as a kind of response. The human being is an instrument for making responses to stimulation. When these responses are accurate and are also appropriate to the situation—Mr. Russell feels the necessity of recognizing purpose—they constitute knowledge. In rejecting the old conception of mind, Mr. Russell sets himself the task of discovering by analysis whether knowledge reveals any grounds for recognizing some data as distinctively mental and others as physical; further, whether it gives grounds for differentiating between the causal laws of mental and those of physical facts. He concludes that it does. Thus there is room for psychology as well as for physical science, although he considers that on the metaphysical plane the distinctions in question will not hold as ultimate.

It is memory knowledge which best illustrates the points which lead Mr. Russell to this conclusion. With regard to sensations, since he has given up belief in the subject and its acts, it is not open to him to distinguish between sensing and

sense-datum, and to term the one mental and the other physical, as Prof. Alexander does. There is only the sensation which is both mental and physical, or, what is perhaps more descriptive, neutral. It is the datum for both psychology and physics. It is physical when it is considered as a member of a system of correlated particulars in different places, such a system being defined as a physical thing. It is psychological when it is considered as a member of the group of simultaneous particulars whose place is that of my body; it is then part of my biography. It is associated with the other simultaneous particulars of the group for the selection of which my body is responsible, and it is also associated with the particulars which have preceded and which will follow that group. It is interesting to note that for Mr. Russell it is the essence of sensation to be independent of past experience. Sensation is to be thought of as an unalterable core in the known, though it is doubtful whether it ever occurs in isolation. Its associates, however, leave its intrinsic character unchanged. This is important, as it makes Mr. Russell's complexes of knowledge compounds after the old pattern of the associationist school.

Unlike the Behaviourists Mr. Russell believes in the existence of images, and these he regards as mental. He thus makes a definite distinction between images and sensations, a distinction which, in accordance with the preceding chapter, we should term one of kind, not of degree. He examines the various grounds put forward for distinguishing sensations and images, and considers that the most adequate is difference in their mode of causation and in their effects. Here Mr. Russell introduces the theory of mnemonic causation. His theory is Prof. Semon's with a difference. Mr. Russell is reluctant to adopt engrams. The cause of a given event may be looked for not only in the present conditions but also in some past event. Images in respect of their causation and of their effects exemplify mnemonic causation. This is Mr. Russell's new recognition of the influence of past history. Mnemonic

causation is to be found in memory, habit, and even in perception, where it accounts for the presence of image factors in the complex. Mr. Russell regards mnemonic causation as characteristic of mental phenomena. He seems willing to admit that it may also be characteristic of physiological phenomena, and he is doubtful how far it is an ultimate law ; he even considers it probable that it is derivative from ordinary physical causation in nervous and other tissue. (cf. *The Analysis of Mind*, p. 307.) Interpreting a causal law as the expression of an observed approximate uniform sequence and abandoning temporal contiguity as an impracticable ideal, Mr. Russell accepts a past event *not merely as a member of a chain of events leading up to the present event, but as itself constituting with the present conditions the proximate cause of the effect in question.* (cf. *ibid.*, p. 78.)

Memory involves images, but imagery alone is insufficient to characterize the memory complex, since imagination is also an image complex. The images of memory are accompanied by the feeling of familiarity ; it is this which in Mr. Russell's view distinguishes true from false memories ; they are also accompanied by a feeling of 'pastness'. He demonstrates the nature of this feeling by comparing, as he did on his old theory, actual sensation, fading sensation, and the immediate memory-image. The difficulty now is that there is no subject to experience these feelings, so they are transferred to the object. The feeling of familiarity and the feeling of 'pastness', essential for memory, are spoken of as characters of the image 'The first', Mr. Russell says, 'leads us to trust our memories, the second to assign places to them in the time series.' (*ibid.*, p. 163.)

But memory involves more still, it involves belief. Here Mr. Russell is conscious that the rejection of the subject makes a complicated theory necessary. He selects for analysis the case of a memory which is in terms of images rather than words, for like the Behaviourists he is of opinion that words

may merely represent habits of association. When such a memory occurs there is a belief which is tantamount to the judgement 'This has existed before', or 'This has occurred before'. The 'this', he says, may refer indifferently to the memory-image or to its prototype in sensation. The present occurrence then is the memory-image with, let us say, the feeling of familiarity and the feeling of pastness already referred to. There is also, according to Mr. Russell, a feeling of reality, 'which is a feeling akin to respect,' and there is a relation between the image and the feeling of reality, 'of the sort expressed when we say that the feeling refers to the image'. (*ibid.*, p. 186.) This phrase would seem to indicate that this feeling, unlike the feeling of pastness and the feeling of familiarity, is not a character of the image, but a separate factor in the complex. Finally, there is the belief-feeling, said to be based on the familiarity and the pastness, and it is this feeling which is the distinctive feature of memory. The past tense in 'This existed', 'This occurred', is expressive of the memory belief-feeling. Mr. Russell surmises that there may be three different kinds of belief-feeling of which this memory feeling is one. Such then is his analysis of the complex, a memory.

Mr. Russell tells us that introspection may be defended on the ground that there are observed facts which are private facts inaccessible to the objective method, and secondly, that since some observable facts do not obey the laws of physics, a method other than that pursued by the physical sciences is justifiable. In his analysis of memory we find 'private facts', viz., the image and the various feelings, and we find the law of mnemonic causation. One concludes, therefore, that, as in Mr. Russell's old theory, introspection is essential for a psychology of memory. What is one to say about the analysis itself? One looks back at James Mill's analysis of memory. There is the same attempt to treat memory as a complex and to analyse it into its ultimate

constituents. For Mill 'there is not only the idea of the thing remembered, there is also the idea of my having seen it'. This 'very complicated idea' was for Mill built up by the fundamental laws of association, an instance of inseparable association, a belief. In other words, the ultimate factors of the complex are ideas (images) and the laws of association. For Mr. Russell they are images, laws of mnemonic causation, and belief-feeling. There is after all a very close parallel in the general line of attack between *The Analysis of the Phenomena of the Human Mind* and *The Analysis of Mind*. There is the same attempt to analyse all the recognized types of knowledge, perception, memory, thought, and to reduce them to simple constituents and to a special law of causal connexion. Mr. Russell's mnemonic causation may be said to play for him the part which association played for Mill. Thus, he says, it is mnemonic phenomena which give the continuity of a 'person' or a 'mind', just as it was 'inseparable association' which supplied the bonds of a 'self' for Mill. The aims of the two writers are of course different. Mill did not aspire to prove that the ultimate elements of mental complexes, viz., sensations, were neutral, common to physics and psychology. He did, however, prepare the way for J. S. Mill to take what after all is the same step with its direction reversed, viz., to analyse things into permanent possibilities of sensation.

Has Mr. Russell succeeded in his analysis of memory? Has he so analysed memory that in reviewing the whole situation he will be able to say, 'there is no ultimate specific character in the stuff of mental complexes; psychology is distinguished from physics only by the nature of its causal laws (these account for the difference between sensations and images), and further by the manner in which some of its facts are known'? We saw that James Mill's analysis of memory failed to satisfy his son. J. S. Mill found that it failed to account for the characteristic belief of memory. He found that such belief was not a case of inseparable association. The difference

between remembering and imaging was an ultimate difference in experiencing, which no analysis of the ingredients of memory knowledge could reveal. Is the same true of Mr. Russell? How does Mr. Russell dispose of his belief-feeling? Let us pass by the difficulty of understanding how mnemonic causation, in giving rise to an image, can endow it with the feeling of pastness and the feeling of familiarity; though the generation of such characteristics from neutral particulars would seem to demand of mnemonic causation a potency greater than that of mental chemistry. Mr. Russell's treatment of belief-feeling is vague by his own criterion of vagueness. It is appropriate now to this, now to that, point of view.¹ When he tells us that he distinguishes three kinds of belief-feeling directed towards the same content, memory, expectation, and bare assent, when he tells us that the objections against Meinong's analysis of knowledge into act, content, and object, are not valid against belief, because 'believing is an actual experienced feeling, not something postulated like the act' (ibid., p. 232), there would seem to be implied the duality of a subject and an object. So again when he asserts, 'Believing seems the most mental thing we do, the thing most remote from what is done by mere matter. The whole intellectual life consists of beliefs.' (ibid., p. 231.) But when one reads that belief feelings are 'complex-phenomena consisting of sensations and images variously related' (ibid., p. 300), we have slipped from believing to an analysis of the content of a belief. In the end we have no place assigned to belief-feeling. We do not know whether it is regarded as mental or physical or neutral, whether it is a relation between data or is itself a datum. Mr. Russell has thrown his 'lump of putty', and the lump has flattened out

¹ 'A word is vague when it is in fact applicable to a number of different objects because, in virtue of some common property they have not appeared to the person using the word, to be distinct.' 'To try and hit an object with a vague thought is like trying to hit the bull's eye with a lump of putty.' (*The Analysis of Mind*, pp. 182, 184.)

to cover the bull's eye of subjective psychology and the ring of neutral realism.

It is curious that Prof. Alexander should try to reconcile the retention of 'mental stuff', experiencing, with the rejection of introspection, while Mr. Russell attempts to reconcile the retention of introspection with the rejection of 'mental stuff', experiencing. Nowhere does the difficulty of each feat show more clearly than in the treatment of memory.

We have, in conclusion, to look at the treatment of memory in the form of New Realism, which rejects both experiencing as mental stuff and private facts known by introspection. It posits an organism responding to environment. At any moment there are entities to which it responds and entities to which it does not respond. The former may be regarded as a cross-section of the whole environment. The entities to which it responds are not physical things, but mathematical and logical entities, facts of spatial and temporal order, motion, degrees of resemblance and of intensity, fragments of what Prof. Holt calls the 'neutral-mosaic', to which neither the label physical nor the label mental may be applied. If we consider the whole life of an organism there will be an ever-changing series of such cross-sections. In the case of the human being the cross-section constituted by the environment and man's response is consciousness, and a whole series of such responses would constitute the history of a mind. Consciousness is thus a part of being. 'My' consciousness and 'your' consciousness can overlap, when the conditions defining the cross-section so require it, just as the tracts illuminated by beams from two search lamps may be in part the same, or the one tract may include the other. (The analogy is Prof. Holt's.) No facts of consciousness are essentially private and inaccessible to the consciousness of others, though the conditions defining cross-sections may render them so in fact.

For Prof. Holt no entity in space and no event in time has any absolute position. Its position is fixed by its relation to other entities. Theoretically one can distinguish between the spatial position of any entity in the cross-section of consciousness and the position of the entity in the whole of which the cross-section is a part. The cross-sections defined by response and environment may be fragmentary as compared with such a whole, but the spatial relations in the cross-section are identical with the spatial relations in the whole, and the space of the cross-section is the space of the entities in the whole.

“ ‘Here’ is but a focus at which our knowledge of space is most minute and adequate. . . . The “here” is no more in itself a position than any one of the many “theres”, but all alike have position in virtue of their relations to one another.’ ‘Our mind’s knowledge of space . . . is discontinuous and fragmentary. . . . It compares with “real” space somewhat as the system of prime numbers with the system of whole numbers.’ (*The Concept of Consciousness*, p. 240.)

A parallel theory is applied to time. Just as the eye is an instrument for responding to entities distant in space, so memory is the instrument for responding to events distant in time. The position of an event in time will be determined by its relations. To use Prof. Holt’s illustration: the idea of Noah building his ark is before the idea of Caesar building his bridge, which again is before that of Michelangelo planning the dome of St. Peter’s. Just as there is no absolute ‘here’, so there is no absolute ‘now’. For Prof. Holt will not recognize that there is such a problem as that of reconciling a present operation, remembering, with a past event remembered. Just as in the eye the organism has a ‘receptor’ for distant stimuli, so in the organization of its nervous system the organism has ‘a mechanism of docility’ for stimuli distant in past time. ‘The argument, therefore, that one’s thought is here and now, because one’s nervous system is active here and now, is not valid.’ (*ibid.*,

p. 247.) Again, the 'I' which is declared to be now remembering cannot be defined by reference to a temporal event. The cross-sections which are consciousness contain other relations than those of space and time. 'I,' so far as it means anything, is volitional, it is expressive of purpose. A complete account of the cross-sections of consciousness, following each other from moment to moment, just like a complete account of any other cross-sections of being, would yield a generative law or formula expressive of the sequence of terms. Such a law for consciousness would be purpose. The laws of volition and the laws of nature are 'formulae that generate explicit sequences which "fulfil" them'. (ibid., p. 295.) It will be seen that upon such an interpretation the distinction of final and efficient cause is fatuous. For Prof. Holt the best interpretation one can give to 'I' is that of the 'dominant purpose' of the cross-section. It is the law of the cross-section. But a law neither has position in time, nor is it itself extended in time. Therefore the 'I', in 'I am now remembering', is not defined by reference to any 'present' event. Can 'now' then have no correspondence with 'real' time? The answer is that just as 'here' was the focus where knowledge of space was most minute and was to all intents and purposes itself so much of space ('real' space), so 'now', the specious present, will be the focus of that knowledge of the temporal system which is most adequate and which approximates to so much of time ('real' time).

It will be seen that this account of memory ignores many of the questions raised by other writers. Just as for Mr. Russell there was no distinction between sensation and sense-datum, so for Prof. Holt there is no distinction between image and object remembered. Prof. Holt deals very lightly with the distinction between memory and imagination which in other writers calls for some theory as to the nature of belief. He declares that imaginary ideas are in the great realm of being equally with perceptions, and their position in con-

sciousness is determined, just as in the case of perception, by the responses of the nervous system. We are warned against the 'error of the hod-carrier', with whom Prof. Holt would bracket the idealist; viz., that of regarding nervous responses as functions of some 'ectodermal impact'. This, however, does not help us to understand how or why the ideas of memory are differentiated from the ideas of imagination. Presumably Prof. Holt would in the end deal with the difference in the same way as he deals with the difference between truth and error in general. Truth and error belong only to relations. Error is that conflict of relations which when expressed in propositions becomes contradictory propositions. Similarly, it might be maintained that only ideas in their relations could be contrasted as respectively memory and imagination. Ideas of imagination would be such as imply conflicting relations. When contrasted with memory they would give rise to conflicting temporal relations; when contrasted with perception, conflicting spatial relations. In other words, the difference between memory and imagination must lie in their contents. But in that case a train of memory which by reason of lacunae lacked self-consistency ought to be *ipso facto* a train of imagination.

But to return to memory as knowledge of the past. The contrast between past and future in relation to the present is for Prof. Holt a spurious temporal relation. It is the relation of entities to volition, not their relations to one another as before and after. Present, past, and future are terms whose import is in behaviour. They express differences in the conditioning of response by environment. Prof. Holt suggests that it might be better to recognize only two categories 'the entities on which the will does not operate and those on which it does'. (ibid., p. 254.) What bearing has this on memory as knowledge of the past? Suppose I remember a series of events, say, the arrival of a train, my friends' greeting, the bustle of the station, the drive in a cab,

and so on ; there will be ' before ' and ' after ', identity with ' real ' time, let us say, but what is meant by terming the whole series ' past ' ? Is this a spurious temporal relation ? If one could continue the whole series of events in memory until it is terminated in a position in time which was adequately known, the ' now ', to call it past would be to regard it as ' before ' this position, and I presume everything would be plain sailing for Prof. Holt. But in the absence of such a completion of the memory series in the ' now ', what is meant by terming the events past ? Are there always in the cross-section events known with the minuteness of ' now ', a focus of reference in relation to which all memories are ' before ', or are the memories past only in the sense that they are events on which the will does not operate ? This whole question of volition and purpose is difficult. When one reads of the ' entities on which the will does not operate and those on which it does ' as tantamount to the past on the one hand and the present and future on the other, one cannot feel sure that the organism's responses, instead of discreetly defining the boundaries of that cross-section *which is itself* consciousness, have not quietly been changed into *conscious attitudes towards the cross-section* (cf. pp. 253, 254, and ch. 14). The volitional ' pastness ' of memory becomes something very like a subject's attitude towards the known. In the ' I am now remembering ' one is puzzled as to how the purpose of the cross-section constituting consciousness (the law of the cross-section already referred to) becomes known. To adapt Mill's phraseology, how can something which *ex hypothesi* is the generative law of consciousness be aware of itself as such a law ?

Does Prof. Holt give us any explanation of the difference between remembering our own past experiences and remembering such facts as those he cites, viz., that Noah built his ark before Caesar built his bridge ? Let us say that last night I visited a certain room, opened a drawer and saw

within it a key. To-day I remember this. The cross-section to-day at the moment of memory would seem on Prof. Holt's theory to be a repetition of the cross-section of yesterday with all the sequences preserved, but if one insists that the memory to-day is not merely of the key lying in the drawer, but of *my seeing* the key lying in the drawer, how does repetition account for it? 'My seeing' was *ex hypothesi* not part of the cross-section yesterday. It defined the cross-section, but could not fall within it. How then can it be remembered. Some new interpretation for 'my seeing' must be found. It may be argued that I saw parts of my own body, that I responded to organic stimuli when seeing the key, and that it is these facts which are in the cross-section of to-day and which cause me to say that I not merely remember the key, but remember seeing the key. In reply one may urge that it is straining facts to declare that some part of the organism is always in the cross-section which is constituted by one of its responses to environment, and that even so it is not clear how the present cross-section of memory appropriates the part of the organism which was in the original cross-section. The relation between the key and the organic stimuli, or the key and the seen arm, in the cross-section of memory should be what it was in the original cross-section of perception. Yet in the perceptual cross-section there was nothing to give rise to such knowledge as is expressed by the memory: 'I remember *seeing* the key.' On the contrary we seem to be up against one of those private facts which cannot be analysed into relations between fragments of the neutral mosaic. Any neural response in the cross-section to which the object may be said to be related, can only be related to it as one object to another within consciousness. There can be a *seen* neural response, but not a *seeing* response. I suspect that here, as in volition, the response, which should merely define the cross-section, is made to play the part of experiencing subject.

This, I take it, is the difficulty which Prof. Alexander had

in view when he asks how any object can be regarded as *my* object, if consciousness belongs to the cross-section. In the very passage in which Prof. Alexander criticizes Prof. Holt, he declares that we know that we know, or that knowing and knowing that we know are one and the same thing, and yet he goes on to deny the possibility of reflective self-consciousness! We have criticized his account of memory as vitiated by this failure to recognize introspection. In Mr. Russell we criticized the attempt to analyse private facts into the same constituents as objective facts, pointing out that the attempt breaks down in the case of the belief-feeling which is declared to be essential for memory. In Prof. Holt both sources of failure are combined. We conclude, therefore, that a psychological theory of memory which shall be in harmony with the principles of these schools of New Realism has not been devised.

V

THE CONCEPTION OF MEMORY IN THE PHILOSOPHY OF M. BERGSON

IN Chapter I we said that Samuel Butler was able to justify memory as a biological conception by reason of his view of life. His theories set forth with racy incisiveness furnish interesting parallels to those presented more elusively by M. Bergson, and for this reason will be reviewed here.

In the introduction to *Luck, or Cunning?* (1886) Butler, referring to his former books, tells us that the aim of *Life and Habit* (1877) was to show that bodily and mental acquisitions are stores of memory. The aim of *Evolution Old and New* (1879) was to prove that the memory in question must be 'mindful' and 'designing', while *Unconscious Memory* (1880) attempted to explain the *modus operandi* of such a memory.

Luck, or Cunning? is to reinforce the lessons already given, upholding his theory of the interdependence of 'want' and 'power' against the theory of natural selection. 'Stripped of all detail the point at issue is this: whether luck or cunning is the fitter to be insisted upon as the main means of organic development.' (*Luck, or Cunning?* p. 72.) Butler prophesies that what he has to say is more likely to interest future students than his immediate public.

The fundamental fact in the universe is change. 'Life and death are the extreme modes of something which is partly both and wholly neither; this something is common ordinary change; solve any change and the mystery of life and death will be revealed.' (ibid., p. 75.) Common sense sees life and death as distinct states. If a thing is alive it is all alive, if dead, stone dead; and since philosophers try to make the language of common sense serve the purposes of philosophy, it is difficult for thought to comprehend the interdependence of life and death, the organic and the inorganic. Similarly, 'common sense does indeed know what is meant by a 'thing' or an 'individual', but philosophy cannot settle either of these two points. . . . The lines we draw, the moments we choose for cutting this or that off at this or that place . . . are as arbitrary as the moments chosen by a South Eastern Railway porter for leaving off beating doormats.' (ibid., p. 173.) The organism and its environment are interdependent; there is no line between ego and non-ego.

The interdependence of life and death makes it impossible to sever generation from generation. The thread of life 'cannot be left unshorn between consecutive seconds without necessitating that it should be left unshorn also beyond the grave, as well as in successive generations.' (ibid., p. 314.)

Since for Butler all substance is 'ensouled' and change in its form betokens change in its mind, and change in mind involves change in form, 'action may be regarded as a kind of middle term between mind and matter; it is the throe of

thought and thing, the quivering clash and union of body and soul.' (ibid., p. 79.)

Just as life is interwoven with death, so is design interwoven with undesign, cunning with luck, 'a rope of many strands'.

Since life is teleological and the design is within the organism and not, as Paley taught, in the mind of some external Creator, plant life equally with animal life must be declared 'intelligent'. Butler thinks we should find less difficulty in accepting this doctrine if we did not misinterpret the term 'intelligent'. We use it to express knowing what we do and why we do it, as well as to express 'knowing what to do'. Plants are intelligent only in this latter sense.

Why should life have developed along two main lines and along two only, the animal and the vegetable? Butler's answer is in terms of design. If there arises a point where two courses offer equal advantages, then, since function and form are interdependent, there will arise two sub-divisions of the living form.

Such equal advantages are offered by the policy of sitting still and making the best of what comes one's way and by the policy of going in search of what one can find. The first is the way of plants, the second the way of animals.

Butler faces the question, why does the mental change implied in all life become conscious? It is, he says, a question which seems to require a book to itself. It actually receives, however, only the eleven concluding pages of *Luck, or Cunning?* Feeling (let us say, 'conscious experience') is declared to be an art, the result of laborious development, and ideas of sense objects are an advanced stage of this art. As an art it is 'the outcome of a mind that is common both to organic and inorganic', but 'it is not a part of mind itself; it is no more this than language and writing are parts of thought.' (ibid., p. 307.)

Butler's account of the development of this art is scanty. 'It would seem as if, in the first instance, we must have arbi-

trarily attached some one of the few and vague sensations which we could alone at first command to certain motions of outside things as echoed by our brain, and used them to think and feel the things with, so as to docket them, and recognize them with greater force, certainty, and clearness—much as we use words to help us to docket and grasp our feelings and thoughts, or written characters to help us to docket and grasp our words.’ (ibid., p. 306.)

Sensations would seem to be ‘representations’ in the sense of ‘standing for’, ‘signifying’, but not in the sense of ‘mirroring’, events in the external world. Because the human body is ‘ensouled’, the introduction of change will involve both body and mind. The molecular vibrations and the vague sensations will occur together. It is the latter which are cognized and from which ideas arise. We are told ideas are no more like the motions of the brain than they are like the movements which gave rise to these. Ideas are declared to be symbolic, ‘conditioned by changes going on within ourselves as much as by those outside us’. (ibid., p. 308.)

Of a material substance we know nothing apart from its states or conditions, and these states and conditions are only our way of docketing the kinds of motion going on in the uncognizable substratum.

‘If the state of a thing depends upon its vibrations, it must be considered as to all intents and purposes the vibrations themselves—plus of course, the underlying substratum that is vibrating.’ (ibid., p. 310.)

Thus

‘a pat of butter is such and such a disturbance of the unknowable underlying substance. . . . In communicating its vibrations, therefore, to our brain a substance does actually communicate what is, as far as we are concerned, a portion of itself. . . . The vibrations of a pat of butter do, then, actually put butter into a man’s head. . . . The more butter a man sees and handles, the more he gets butter on the brain . . . till,

though he can never get anything like enough to be strictly called butter, it only requires the slightest molecular disturbance with characteristics like those of butter to bring up a vivid and highly sympathetic idea of butter in the man's mind. If this view is adopted, our memory of a thing is our retention within the brain of a small leaven of the actual thing itself, or what *quâ* us is the thing that is remembered. . . . Thought and thing are one.' (ibid., pp. 311-12.)

For 'the underlying substance of the pat of butter' read 'the mind of the pat of butter', and perception will be the communication of mind to mind through the medium of matter in motion. Change in the pat of butter is functionally dependent on mind, but similarly the molecular movements conveyed to the human organism also have a functional relation to mind. In terming the relation 'arbitrary' Butler is denying similarity between sensations and vibrations, but he cannot without contradiction of his whole teaching be understood as denying design. The relation is not capricious. (cf. Berkeley's use of 'arbitrary' with reference to the laws of nature.)

In *Life and Habit* Butler tells us that perfect knowledge and perfect ignorance are extremes which meet, both alike being unconscious; similarly, perfect volition and perfect instinct are alike unconscious. Awareness of, consciousness of, belongs to a middle region. 'Knowledge is in an inchoate state as long as it is capable of logical treatment, it must be transmuted into that sense or instinct which rises altogether above the sphere in which words can have being at all, otherwise it is not yet vital.' 'Science is like offences. It must needs come, but woe unto the man through whom it comes, for there cannot be much beauty where there is consciousness of knowledge, and while knowledge is still new it must in the nature of things involve much consciousness.' (*Life and Habit*, pp. 29, 38.) The perfect knowledge which is unconscious is the knowledge built up by degrees and transmitted from generation to generation. It is the work of memory.

It is, to borrow Grant's description of *ἐξῆς* in Aristotle's Ethics, a *δύναμις* on the farther side of *ἐνέργειαι*.

Such then in outline is Butler's dynamic conception of nature and of knowledge: perpetual change interweaving the living and the dead, the organic and the inorganic, an unbroken continuity determined by the purposiveness of mind. To quote from his closing paragraph,

'Bodily form may be almost regarded as idea and memory in a solidified state. . . . It . . . arises from and through action. Action arises normally from and through opinion. Opinion, from and through hypothesis. "Hypothesis," as the derivation of the word itself shows, is singularly akin to "underlying, and only in part knowable, substratum", and what is this but "God" translated from the language of Moses into that of Mr. Herbert Spencer?' (*Luck, or Cunning?* p. 316.)

M. Bergson's *Essai sur les données immédiates de la conscience* (1889) was published only three years later than *Luck, or Cunning?* but neither in this nor in the two subsequent volumes of his trilogy does M. Bergson show any acquaintance with Butler. If, then, parallels exist between the doctrines of these two thinkers, the doctrines themselves must none the less be regarded as the outcome of independent lines of speculation.

In the essay, translated into English under the title of *Time and Free Will* (1910), M. Bergson sets himself the task of bringing before his readers the nature of immediate experience, the interpenetration of moment by moment in the qualitative stream of consciousness. It is this rich continuity of being, throbbing through each individual, which constitutes true duration. This duration of living experience has, however, been overlaid by thought. In the attempt to discriminate and classify, to separate by analysis this or that feature as characteristic of this or that moment of life, we have lost the flow of true duration, and substituted for it a series of successive states, each in itself static. Such a conception of conscious experience leads us to self-contradictory notions and renders

the comprehension of movement impossible. The work of the intellect in analysing and classifying immediate experience involves the conception of space. For in characterizing and classifying mental states we are treating them as units which can be juxtaposed, and which *qua* units can be repeated and counted. To treat them thus is to treat them as homogeneous yet distinguishable, and this is, in essence, to spatialize them, space being the conception of a homogeneous medium wherein there are distinguishable positions. This conception of space, which falsifies true duration, replacing it by ordered succession, not only leads to confusion in our notions of movement, e. g. the puzzles of Zeno, but further to confusion with regard to causation.

In physical science causation involves spatialized time, uniformity of succession; the law of causation is the claim that anywhere on the time line successive positions can be repeated. But true causation implies that a given event is a creation from what has gone before. What has been, has endured and become what is. There is no possibility of laying down in advance what will be. Causation is creation. The future arises out of, and may be explained by, the past, but it can never be deduced from it in advance. Such true or vital causation is exemplified in the human will whenever 'our acts spring from our whole personality, when they express it, when they have that indefinable resemblance to it which one sometimes finds between an artist and his work'. (*Time and Free Will*, p. 172.) It is not regularity of order which is the essence of true causation, but the evolving of the new moment in all its concreteness out of the enduring past. That necessary connexion of cause and effect, formulated in the law 'whenever *a*, then *b*', can only be found in spatialized time, wherein *a* and *b* are stripped of all that characterizes them as concrete events, and preserve only the character of occupying successive positions in 'geometric' time. This distinction of vital causation and the causation of physical science gives M.

Bergson a basis for meeting the dilemma between Free Will and Determinism. A man is only free when his action exemplifies creative or vital causation.

The teaching of the essay is ' writ large ' in *Creative Evolution* (1911) (*L'Évolution créatrice*, 1907). That which in the individual is the experience of true duration, is in Nature as a whole the impetus of life (*élan vital*.)

Science, the work of the intellect, falsifies Nature by using static conceptions and mechanistic principles and explanation. It therefore leads to self-contradiction and fails to interpret life. M. Bergson would point the road to a more excellent philosophy wherein ' intuition ', the power in man which is complementary to intellect, shall correct the faults of the latter. By intuition man should be able to replace himself within the evolutionary process of life and reinform the analytic knowledge of science by the light of absolute experience.

Before taking up M. Bergson's account of memory we will compare the doctrines of the essay and of *Creative Evolution* with the teaching of Butler.

We have seen that Butler was aware of the inadequacy of the clear-cut distinctions of common sense to express the interdependence of life and death, of the individual and his environment, of design and undesign. ' The error of our philosophers consists in not having borne in mind that when they quitted the ground on which common sense can claim authority, they should have reconsidered every thing that common sense had taught them ' (*Luck, or Cunning ?* p. 167). Butler did not develop the contradictions into which such hard and fast divisions of thought lead us, nor did he connect such errors with our conception of space, but he did, significantly enough, entitle his chapter on the illusiveness of such clear-cut distinctions, ' The Way of Escape '.

Butler found the riddle of the universe in change : it is here that M. Bergson finds his central problem.

Butler rejected both mechanism and finalism, when the latter

was interpreted as meaning the design of an external Creator. M. Bergson rejects both as inadequate to explain the course followed by the vital impetus.

Butler saw plant life and animal life, not as progressive orders of a serial development, but as 'embodiments of the two great fundamental principles on which alone it is possible that life can be conducted'. (*Luck, or Cunning?* p. 115.)

M. Bergson speaks of belief in the serial development of a single tendency as 'the cardinal error which from Aristotle onwards has vitiated most of the philosophies of nature'. (*Creative Evolution*, p. 142.) 'Vegetables and animals have chosen two different kinds of convenience in the way of procuring the carbon and nitrogen they need'. (*ibid.*, p. 119.)

Do Butler and M. Bergson, then, take the same view of life? We have seen that for Butler life is the manifestation of mind. The form of any living thing is due to its mind. 'The more a living thing knows its own mind the more living it becomes.' (*Luck, or Cunning?* p. 167.) The continuity of life is dependent upon continuity of mind. 'Life is the being possessed of memory.' It holds from moment to moment and from generation to generation.

Let us turn to M. Bergson. Life is creative, 'a continually growing action.' 'The living being is above all a thoroughfare, and the essence of life is the movement by which life is transmitted.' (*Creative Evolution*, p. 135.) 'Heredity does not only transmit characters, it transmits also the impetus in virtue of which the characters are modified, and this impetus is vitality itself.' (*ibid.*, p. 244.) It is the continuity of life rather than the continuity of mind which M. Bergson stresses.

In speaking of nature as the realization of a plan M. Bergson says, 'Nature is more and better than a plan in course of realization. A plan is a term assigned to labour: it closes the future whose form it indicates. Before the evolution of life, on the contrary, the portals of the future remain wide open. It is a creation that goes on for ever in virtue of an initial

movement.' (ibid., p. 110.) Is such creative life more than the manifestation of a 'mindful and designing' memory? Apparently, yes. We read that it is 'consciousness or rather supra-consciousness, that is at the origin of life'. (ibid., p. 275.) Again, that 'in reality life is of the psychological order'. (ibid., p. 271.) But although life for M. Bergson may be the manifestation of a soul, it is not the manifestation of the memory-filled mind or soul of the individual instinct with life, as it is for Butler. This is a significant difference. Life is greater than the living individual. We may say that for M. Bergson it should be written with a capital.

We must now turn to M. Bergson's account of memory and knowledge. In *Matter and Memory* (1911) (*Matière et Mémoire*, 1st ed., 1896) M. Bergson claims for man two memories, one which imagines and one which repeats. The former *represents* the past, the latter *enacts* it. The topics usually discussed in psychology under 'habit', 'learning by rote', illustrate the latter, while reminiscences illustrate the former. The relation of these two memories to each other is dependent upon the relation of the body to the soul. Memory is, M. Bergson tells us, 'a privileged problem' for the study of the relation of body and mind.

The human body is an object having its place in the world of change together with other objects. It is a centre of activity and a centre upon which the activities of other objects may be exercised. By reason of its nervous system it is 'selective' in its receipt of such activities and 'indeterminate' in its response. In the world of change there is action and reaction continuous everywhere throughout that world. But in relation to the nervous system of an organism there is limitation in action and reaction. And the more complicated the nervous system of any organism, the more selective it is in its receipt of stimulation and the more indeterminate in its response. It is just this selectiveness and indetermination which occasions perception. There is 'merely a difference of degree and not

of kind between being and being consciously perceived'. (*Matter and Memory*, p. 30.) According to M. Bergson we have not to deduce consciousness, because we have assumed it in a world of objects acting and reacting upon each other. It is, however, selectiveness and indetermination that give rise to 'discernment'. 'Consciousness is the light which plays around the zone of possible actions or potential activity which surrounds the action really performed by the living being. It signifies hesitation, choice.' (*Creative Evolution*, p. 152.) 'They' (living beings) 'allow to pass through them, so to speak, those external influences which are indifferent to them; the others, isolated, become "perceptions" by their very isolation.' (*Matter and Memory*, p. 29.) Such is the doctrine of pure perception.

Such perception, however, is merely a convenient fiction to illustrate the relation of the percipients' body to other objects in the world of change. It is a fiction, because in the first place it neglects duration. Even the act 'whereby we place ourselves in the very heart of things' is not instantaneous. In order to understand how 'an uninterrupted series of instantaneous visions which would be a part of things rather than ourselves' can become continuous duration, we have to invoke memory. In the second place, the choice of response which constitutes discernment is guided by memory. It is past experience which determines the actual response made. Thus perception without memory is a fiction.

M. Bergson proceeds to consider recognition where perception and memory are interlaced. Recognition is often an affair of action. It means knowing what to do, and does not necessarily involve the representation of past experience. If images occur their function is to interpret the present with a view to action. Failure of recognition is often merely a failure in motor habits, a failure of habit memory. None the less there is a type of recognition which does involve the spontaneous recall of images, and it has been held that failure

of such recognition is due to the loss of memory-images. The different varieties of aphasia were regarded as demonstrating this : Sensory Aphasia, wherein the patient fails to recognize spoken or written words, illustrating the loss of auditory or visual images ; Motor Aphasia, wherein the patient is unable to speak though free from any defect in the requisite muscles, illustrating the loss of the images of articulated words. It was on this interpretation of aphasia that M. Bergson made his great attack. Attentive recognition, under which rubric the recognition of words may fall, involves, according to M. Bergson, an attitude of the body, an attitude of inhibition or strain, and so far M. Ribot was right in describing attention as a muscular experience. But this attitude is only preparatory. It prepares for the positive movements initiating perception, and for the invocation of the interpretative memory-images which finally determine perception. ' Every attentive perception truly involves a reflexion, in the etymological sense of the word, that is to say the projection, outside ourselves, of an actively created image, identical with, or similar to, the object on which it comes to mould itself.' (*ibid.*, p. 124.) M. Bergson would attribute the failure in spontaneous speech, or in understanding spoken or written language, to inability ' to adopt, under the influence of the external stimulus, the precise attitude by means of which a choice could automatically be made among our memories '. (*ibid.*, p. 132.)

Recognition can thus break down at two different ends of the motor process. In attentive recognition it breaks down through failure in the fine bodily adjustments requisite for the initiation of imagery ; in automatic recognition, through failure in the bodily movements requisite for the appropriate response. In neither case is there any loss of, or impairment in, the store of relevant images. M. Bergson works out the absurdities consequent on any hypothesis of images as something stored in brain cells, and of brain lesions as destructive of images. The nearest approach to a theory of an image centre in

the brain which M. Bergson makes is the suggestion that there may be something, metaphorically called a keyboard, which may be played upon by memory in the same way as the sense organs are played upon by sense stimuli, and which may affect the same nerves and brain centres as the sense organ itself.

From the consideration of memory interwoven with perception M. Bergson passes to his theory of Pure Memory. 'Co-extensive with consciousness, it' (true memory) 'retains and ranges alongside of each other all our states in the order in which they occur, leaving to each fact its place and consequently marking its date.' (*ibid.*, p. 195.) The whole of the individual's past experience exists in pure memory. But as in pure perception only a fragment of the activities of the whole universe is selected by our body, so in recollection only a fragment of the past is represented in memory. As the fragment selected in perception is continuous with the whole universe, so the fragment represented in memory is continuous with the whole past. We have no difficulty in conceiving of the unperceived existence of the sense-world, and we ought to find none in conceiving of the unconscious existence of the past, since 'the unconscious plays in each case a similar part.' (*ibid.*, p. 187.)

Pure memory of the past is, as such, powerless, it is detached from the actual. To be of use it must become potential action and share to some degree the character of sensation. Our present is sensori-motor; it is our attitude towards the impending future. To insert itself into the present, the past preserved in pure memory must become an image. M. Bergson makes use of the figure of an inverted cone to illustrate his conception of the relation of pure memory to memory-images, and of both to perception. The apex of the cone resting on the plane of change stands for the response of the body in perception. Pressing into the apex are the images of memory which guide such response. Behind them at the base of the cone lies pure memory. Sections across the cone between

base and apex at different levels would represent different degrees of what M. Bergson calls 'psychic tension'. At the base all the events of the individual's past life are set out in their smallest detail. Only the man who dreams, detached from the needs of present action, can live at this level. At the apex the responses to the world of change are immediate and automatic. Between the two extremes lie varying degrees of imagery and memory.

The so-called laws of association are for M. Bergson the different ways in which memory supplies the needs of the present. Perception gives knowledge neither of the particular nor of the general. For action the discernment of individualizing features is of no importance. The perception only becomes 'particular' when it is interpreted by a memory-image. The records of pure memory, however, are individual, and it is from these that the class concept is built up by analysis. Such concepts, M. Bergson says, move continually between the plane of memory and the plane of action. They tend either to become the individuals which they epitomize or to give expression to their basic common feature through action.

M. Bergson insists upon the distinction between pure memory and pure perception, the former as the work of the soul, the latter as the work of the body. It is true that it is merely convenience of method which leads him to consider pure perception apart from memory, and pure memory apart from perception, but the abstractions adopted for purposes of exposition bring out the fundamental duality of body and soul.

Let us compare this account of memory with Butler's. If we start from the position that all action is evidence of life, and that life is in its nature psychic, then in the action and reaction, which our intellect sketches as a world of things, we have an interaction of psychic forces. Life as continuous has the whole of the past ever behind it. We have seen the sense in which for M. Bergson the present moment can be regarded as

an effect created by the past. Pampsychism, as Dr. Ward allowed, will justify in principle the claim for the survival of the past. So far as the memory which enacts the past is concerned, the memory of instinct and the memory of habit, M. Bergson's doctrine presents a fair parallel to that of Butler. There is the important difference already noticed ; viz., for M. Bergson such memory is expressive of the continuity of life, for Butler it is expressive of the stores of an individual mind.

In considering the relation of M. Bergson's two memories to each other we may notice the two faculties of knowledge which this thinker distinguishes in 'Creative Evolution', Instinct and Intelligence. The two forms of memory would appear to be adapted respectively to the two forms of knowledge. Instinct, as the power by which an organism adapts itself to the requirements of life, can be sustained by a memory which enacts the past, but intellect as the power which decomposes and reconstructs, which aims at predicting movements and manufacturing tools, requires a memory which can form representations. Intellect, in carving out of the flux of the world of change material things, is master of the inanimate. For its work it needs stable images. Indeed we might regard the very detachment of images from the web of pure memory as itself an effort of intellect. In virtue of his instinctive endowment man is one with the rest of organic nature, but in virtue of his ability to use representations he has won a special place in evolution. Instinct and intelligence remain unreconciled in M. Bergson's philosophy. He tells us that they are complementary, 'and they are complementary only because they are different, what is instinctive in instinct being opposed to what is intelligent in intelligence.' (*Creative Evolution*, p. 143.) Advance from one to the other is therefore impossible. Intuition, which might at first sight seem the parallel to Butler's perfect knowledge, is not the outcome of an intellect saturated with memory. It is in its nature more akin to instinct. It is 'instinct that has

become disinterested, self-conscious'. (*Creative Evolution*, p. 186.) This cleavage between Instinct and Intelligence has no parallel in Butler. Although not developed in 'Matter and Memory', the distinction cannot be without significance for the theory of memory.

When one asks how the memory which imagines is related to the memory which enacts the past, one is brought face to face with problems. In the first place it is not clear whether the records of the past belong to the realm of pure memory or to that of memory-images. In contrasting pure memory and memory-images M. Bergson states that it is pure memory which records the past, yet he often refers to the memory of the past as if the past survived in the form of memory-images, e. g. :

'Though the whole series of our past images remains present within us, still the representation which is analogous to the present perception has to be chosen from among all possible representations.' (ibid., p. 114.) 'Consciousness . . . retains the image of the situations through which it has successively travelled, and lays them side by side in the order in which they took place.' (ibid., p. 96.)

Yet it is impossible to conceive how the past can survive in the form of memory-images. How can that which as an event in perception was in the things perceived rather than in the percipient, how can this survive as a memory-image? Again, what would become of the difference in kind between memory and perception, if the memory-image were in any literal sense a survival of the past perception. Such a suggestion seems foreign to the general tenor of M. Bergson's teaching.

Assuming then, the language of certain passages notwithstanding, that the record of the past survives only in pure memory, and that this is the work of the soul, we must conceive of a soul as present at the events of pure perception. And this soul must be the soul of the recording individual. In explanation of a memory which records the details of individual

history, it is not enough to claim the presence of that psychic principle in virtue of which there is life and action. When M. Bergson tells us that 'in perception we grasp, at one and the same time, a state of our consciousness and a reality independent of ourselves' (ibid., p. 270), is he recognizing the presence of an individual recording soul? If so, despite the stress laid upon perception as action, we are bound to regard it as being also, or rather as being in the first place, knowing. If not, how can we conceive of the events of pure perception as recorded by the individual?

This aspect of perception cannot be accounted for by memory-images, since it must itself be the only possible source for such images. What then are memory-images? M. Bergson tells us they are the result of an act *sui generis*, an act which changes the psychic tension.

'Whenever we are trying to recover a recollection, to call up some period of our history, we become conscious of an act *sui generis* by which we detach ourselves from the present in order to replace ourselves, first in the past in general, then in a certain region of the past—a work of adjustment, something like the focussing of a camera. But our recollection still remains virtual; we simply prepare ourselves to receive it by adopting the appropriate attitude. Little by little it comes into view like a condensing cloud; from the virtual state it passes into the actual; and as its outlines become more distinct and its surface takes on colour, it tends to imitate perception.' (ibid., p. 171.)

Are, then, memory-images occasioned by this act *sui generis*? Are they akin to movement? Much of what M. Bergson says implies this, e. g. the passages describing the movements necessary to initiate the image (quoted p. 125); also the following:

'The hearer places himself at once in the midst of the corresponding ideas, and then develops them into acoustic memories which go out to overlies the crude sounds perceived while fitting themselves into the motor diagram.' (ibid., p. 145.)

We are told that the memory-image is already partly sensation. It is difficult to know whether these memory-images are by M. Bergson thought of as permanent entities or as entities which come into momentary being in consequence of the act. The figure of the cone suggests their continuous existence. The act *sui generis* would then occasion our consciousness of them, but not their existence. But, on the other hand, how can they be nascent sensations or in any sense partake of the nature of sensation if they have continuous existence? Where are we to draw the line which is to make memory different in kind from perception? Does it lie between memory and the memory-image or between the memory-image and sensation? Apparently between memory and the memory-image, since we are told that the *memory* of a sensation is *not* a nascent sensation, while as we have seen the image is. But if we draw such a line at all, how can we hold that it is impossible to say where one begins and the other ends? (See *ibid.*, p. 171.)

We saw that for connecting the various levels of his cone M. Bergson relied on the doctrine of psychic tension. Memory, memory-images, and perception represented different degrees of psychic tension. The problem is at bottom the problem of bridging the gulf between movement and knowledge, the one the affair of the body, the other the affair of the mind. M. Bergson would claim a fundamental identity between quantity and quality. Movement he maintains cannot be adequately expressed in terms of space, quantitatively. Movement is at bottom qualitative, for every movement has its specific character as a rhythm of life. In perceiving, the conscious individual catches up the rhythm of the perceived, transposing it into his own tempo. In place of the old opposition of matter and mind M. Bergson gives us a new one—life with its manifold rhythms and the individual soul with its degrees of tension. Will the fact that life is supra-consciousness make the gulf between the affairs of the body and the affairs of the soul narrower? M. Bergson would fain show how essential

each is to each, but does this do more than fringe the brink?

Sometimes we seem to find in M. Bergson an opposition that threatens the very doctrine of perception itself; viz., an opposition between life and matter. For Butler the living and the dead, the organic and the inorganic world, formed an interdependent chain. For M. Bergson they sometimes appear as different, and even as opposing, forms of reality.

'Life is a movement, materiality is the inverse movement, and each of these two movements is simple, the matter which forms a world being an undivided flux, and undivided also the life that runs through it, cutting out in it living things all along its track. Of these two currents the second runs counter to the first, but the first obtains, all the same, something from the second.' (*Creative Evolution*, p. 263.)

If we take this passage at its surface value we can well understand M. Bergson's declaration, 'The double form of consciousness' (Instinct and Intelligence) 'is then due to the double form of the real, and the theory of knowledge must be dependent on metaphysics.' (*ibid.*, p. 188.) But if we are to recognize this duality in the real, we must reconsider the doctrine of pure perception. The activity of the world of change will include that of matter. It may be to this activity that we respond in perception. But if so, how does the activity of our living body consolidate itself with such action? We shall have a gulf to bridge between the life of a living body and the activity of dead matter. It may be argued that M. Bergson intends the opposition between life and matter to be one of direction only. In evidence of this is the description of matter as the extinguished fragments of the rocket of supra-consciousness which lights up organisms (cf. *Creative Evolution*, p. 275). But to accept this is to return to the previous position that all activity is the manifestation of some degree of life, and that all life is psychic in character.

The memory problem then remains. How is an advance to

be made from the memory which is continuity of life to the memory of an individual recording soul. Does M. Bergson's view of life furnish anything to explain the individual soul which in contracting the dance of life to its own span records that dance, the soul which in virtue of its tensions can function as pure memory or as memory-image? The present writer has failed to find any link between M. Bergson's pampsychism and his individualism.

We may grant that Butler wrestled and failed to make memory-images intelligible by a theory of ensouled vibrations, but where Butler gave us one mystery, M. Bergson presents us with three: the impersonal memory of an ensouled body, the individual memory of a spirit mind, and the relation between them.

VI

RETENTIVENESS AS A PSYCHOLOGICAL CONCEPTION

IN the first chapter we asked whether the presentation of memory as a biological problem left the old memory problem of epistemological psychology untouched, whether it replaced it by substituting a wider for a narrower issue, or whether it put the old problem of the philosophers in a new light.

If the criticism of the first two chapters is well founded, it will enable us to rule out the second suggestion. The problem of memory as knowledge of the past cannot be resolved into problems of the lineage of organic processes. Is it then untouched by the teachings of biology? The discussion of New Realism and of the philosophy of M. Bergson will have shown that writers whose primary interest is in philosophy are nevertheless anxious to reconcile the teachings of philosophy with those of biology. Untouched

it certainly cannot be, but we venture to think that the influence of biology on the psychological problem is shown more truly by a new spirit of investigation within psychology itself than by any attempt to graft the findings of psychology on to those of biology, or to restrict the method of the one to that of the other.

We saw that biological conceptions dominated the psychology of Herbert Spencer and that their influence was apparent in the later editions of Bain. A paradigm for the systematic development of psychological theories from basic conceptions had been afforded by the continental writers, and biological conceptions furnished a new foundation for such a systematic treatment.

Psychology in England may be said to have entered upon a new era with the publication of Prof. James Ward's article in the *Encyclopaedia Britannica* in 1886.¹ While profoundly influenced by the traditions of the English Empirical school, Prof. Ward owed much to the line of continental thinkers whose influence was noticed in the case of Hamilton. His psychology may be styled philosophical. Nevertheless he sets forth psychology as an independent body of doctrine the data for which are to be found in experience, that is, in all facts whatsoever so long as these are studied from the point of view of an experiencing individual—the subject of experience. By stressing the subject, Prof. Ward rescued the trend of psychological opinion in England from passing from Associationism to any new form of Presentationism. For Prof. Ward the unity of the subject underlies all the various operations of mind. The faculties of Reid are replaced by differences in the kind of object whereon the activity of the subject is exercised. Psychology is biological in that it studies a life story, but it is mental life that it studies, and studies from within, from the standpoint of the experient. The

¹ Incorporated with modifications in a new book, *Psychological Principles*, 1918.

genetic treatment of psychology by Prof. Stout may in the same sense be termed biological. He defines psychology as 'the science of the development of mind'. (*Analytic Psychology*, vol. i, p. 9.)

If the influence of biology on psychology is to be sought in the treatment of psychology as a study of mental life, we may consider the difficulties of the memory problem noticed in the previous chapters from this point of view. What follows must be regarded as the writer's attempt to work out the memory problem from the standpoint of a psychology wherein the conceptions of process, function, structure, growth, decay, organization, and development have their place. That much of its tenor has been derived from the psychology of Prof. Ward and Prof. Stout will be evident.

(a) *The nature of the memory-image.*

Our study of Behaviourism and of New Realism showed us that the existence and nature of the memory-image was a crucial question in the psychology of memory. We saw in the historical survey that for some writers the image differed from the original of sense in kind, while for others it differed in degree only. Also, that while some regarded it as a persistence of the vestiges of sense, others regarded it as a reproduction called forth by a special occasion. We may, then, consider first the nature of the memory-image.¹

The notion of mental life itself connotes change, succession of events; it also connotes continuity of process. We cannot easily conceive that even the simplest forms of life would present us with a single line of changing events, but believe that there would be a multiplicity of processes, such that, if we took a cross-section at any moment in the life, we should

¹ No effort will be made to relate the theory here sketched to any physiological theory of the nature of an image, such as the theory of Prof. M. F. Washburn or that of Prof. Dunlap. It has not seemed to the writer that the psychological problem would be helped by such an attempt. The 'explication of conceptions' is a prior psychological need.

find this process beginning, that one ending, that one running its course ; further, that wherever we took the cross-section we should find a ' weighted present '. The impetus of the processes which had run their course up to that point would tell on the character of the cross-section. If we use the term ' retentiveness ' to denote the character in virtue of which mental processes are continuous, and in virtue of which the present process is weighted by those which have preceded, ' retentiveness ' would seem to be involved in the very conception of mental life.

It is not easy to group the processes which constitute life into different kinds, but in view of the functions of life we seem justified in recognizing at least two groups of processes, those whose function is knowing and those whose function is doing : cognitive and conative processes. Affective processes seem to the writer to be a third group with a specific function in life, a function roughly denoted by the term ' appraisalment '. In the early stages of life these processes are not clearly distinguished from one another, and throughout life their co-operation in function may make their distinction one from the other difficult.

Retentiveness as a character of mental life will apply to all mental processes. It is necessary, however, to examine the conception a little more closely. We require to recognize something more than the character of temporal continuity and the weighting of a given process by those which precede it. It is not only the immediately preceding processes which influence the character of a cross-section, but also those which were ' in the past '. The effects of repetition, which are seen as familiarity in the case of cognition and as facility in the case of conation and the affective processes, testify to ' retentiveness ' in some further sense. We thus have to find a place for some conception of *persistence*. We cannot fall back on any modification in material structure as an abiding link to support change in function, nor on any persisting

features of structure as a support for continuity in function. All spatial conceptions fail, and our thought trained on spatial relations is baffled; the very notion of 'persistence' is permeated with spatial significance. What is it that abides in mental life? Nothing. No ghost processes. No operations of minimum intensity. Yet there is a sense in which there is 'persistence' in mental life. A succession of processes of the same kind may be regarded as continuous, and any one selected for study is 'weighted' by what precedes it. Further, if we consider the function of the processes we can say that the later ones carry on the function of the earlier ones. E.g. consider the series of cognitive processes relative to the sound of a steam whistle. The sequence of processes can be considered as the continuance of one process. It is the differentiation into moments rather than the recognition of continuity that is the work of thought. We should say there was awareness of one long sound. Here then there is persistence in respect of function.

If we apply the notion of continuity of function to processes of the same character, we can conceive how, despite temporal discontinuity, the repetition of a process may be regarded as a continuation of an old process. If the engine-driver reopens his whistle valve after two or three minutes' silence, we may regard the processes in the hearer as continuing the function of the old processes. We do not need to think of those previous processes in the hearer as persisting, as being anywhere in any sense whatever. It is enough that in considering the mental events in the life of this individual, we cannot leave out of account the fact that those previous processes took place, since the present function implies them. To put it differently, the 'now' of a life in which the old processes took place and the 'now' of a life in which they did not take place would not be the same. In this sense the old processes are retained, and a mental process of a given character may *in respect of its function* be said to have a life story. Facility and familiarity

testify to its progress. In illustration we may take the sound value of some given combination of vowel and consonants in an unknown foreign language which an individual hears all round him. The life story of the sound would show later impressions carrying on the work of earlier. From being a sound lost in the mass of strange sounds, by repetition it gains in definiteness, until it stands out as distinguishable and finally is experienced as familiar. A corresponding story of growing facility could be made out from the continuity of attempts to pronounce the sound in question. So far persistence has been thought of as the direct continuity in time of processes of the same character or as the repetition at intervals of time of processes of the same character. In both cases the persistence is continuity of function. This then is a fuller interpretation of the character of 'retentiveness'. It is an interpretation which applies to all forms of mental process.

We have to consider a manifestation of retentiveness, the recognition of which is bound up with the recognition of selective activity. There is a persistence and continuity of function which belongs *only* to cognitive processes, and belongs only to these in virtue of the relations into which they have been brought by conative effort. When all processes are *qua* processes activities, it may seem unnecessary to conceive of any group of processes as active in a special sense. Perhaps this is partly why Prof. Alexander chose to term all mental processes conations. But the recognition of conation as the name for a special group of processes, even if it were not borne in upon us by an analysis of self-experience and the testimony of language, would seem to be required by the investigation of the processes of cognition. At this point it is no longer possible to avoid referring to the subject and object of consciousness, though in view of their epistemological implications it is to be wished that both terms could be eliminated from psychology.

When one speaks of a sense-impression, the term is perhaps sufficiently neutral to rule out a special act of a subject on the one hand and an object, in the sense of something known, on the other. The word can surely just stand for a mental occurrence of a given character, a mental process, an event, and it is so used here. In the simpler and early forms of mental life there occur these sense-impressions, and though they form part of the life stream of an individual, they are not in virtue of this fact to be regarded as caused by the individual in whose life they occur. They occur in relation to stimulation or are 'given', and may in this sense be termed 'objective'. As processes sense-impressions are cognitive processes, but they are not in themselves cognitions. They subserve cognition, but for this function to be possible it seems necessary, as a minimum, that likenesses and differences between processes should emerge. The process in itself is never 'what is known' when it occurs. (Reservation must be made as regards introspective knowledge, to be discussed later.) Even in the case of a simple sense-quality, such as 'redness', 'coldness', awareness of 'red', 'cold' must be regarded as a 'construction'. In respect of function the process occurring has been assimilated to, differentiated from, other processes. It has a background. If it subserves cognition, it means more than it itself is. At once come the questions, who constructs? who assimilates? who differentiates? and the conception of the individual in whose life stream the process occurs, rises as an answer. But then the individual is not something over and above his mental life. Knowing is the function of the cognitive processes, and we cannot divorce it from the processes as being the function of something else, x , the unknown. Nevertheless we may not simply identify it with these processes considered as events in mental life.

We have said that there is continuity of function with continuity and repetition of process. We have now further to maintain that a cognitive process can be 'representative'.

It is so whenever it means more than is its function in its own right. For, notice, it is in respect of its function that it is representative, not in virtue of its nature as an occurrence. The constructions of sense-perception are the outcome of 'representation', and it is just at this point, if at no other, that the recognition of conative processes seems essential to the story of the development of cognition.

We can only form a hypothesis as to the nature of primitive cognition. Processes of the cognitive type which do not actually subserve cognition never occur in human life. We speak of 'sentience', but even here the processes have some vague 'awareness of' as their function. We need some such hypothesis as that of Prof. Ward's psychological individual to portray the origin of 'meaning'. We can only study its development. In mental life as we know it, apparently in every species of animal, certain predetermined sense-impressions will be selected, i. e. stand out amid the mass of impressions and arouse conative processes, wanting, striving, accompanied by affective processes. This in itself is no reason for limiting conation to these situations; on the contrary, the fact that the groups of 'predetermined' sense-impressions vary in different species, would seem to point to conation as something more fundamental than a process evoked by a limited number of sense-impressions. It may well be that conation can arise with any sense-impression whatever. But confining ourselves to the selections which are predetermined for the individual, the instinctive selections, we find that there will ensue in relation to these a series of conative processes, which however much we may distinguish them as moments or phases are a continuity. There is one continuous endeavour working itself out through them until it is completed. The completion is a moment with an affective value of satisfaction, over and above any other affective process which may be present, whether pleasant or painful. The series of conative processes has its beginning and its

end and a continuity between those points which is independent of continuity in time. The endeavour is throughout accompanied by cognitive processes. In so far as there is bodily activity there will be the cognitive processes of muscular and organic sensations, and there will also be the changing impressions of sight, sound, contact, taste, smell. The continuity of the conative series gives continuity to the cognitive processes, which are thereby brought into relation with one another. This is not to be understood as any loose relation of parallel chains of events, but as an organization of interdependent members. As an illustration take the experiences of a child trying to open a box which, as we say, has excited curiosity. The series of endeavours which starts with the sight of the box, and ends with, or is satisfied by, its opening and the discovery of emptiness, is a continuous whole. Throughout striving and knowing are interrelated; the changing contacts, the resistance here, the yielding there, the changing sight of the box from this angle, from that angle, of the lifting lid, of the lid falling back again, all these sensuous experiences go with the progress of the endeavour. Now it is thwarted, now it is going forward, is intensified, culminates and is fulfilled or complete. Hereafter the box is abandoned, unless a new conation is aroused in connexion with it.

But to return to meaning in sense-perception. Where such organizations as we have described have been formed, any one cognitive process that has entered into the organization can 'mean' the function of any other cognitive process which has entered into the same organization. The construction of knowing in such a case might be termed 'active' in contrast to the passive construction due to continuity, similarity, or repetition of process. We may illustrate by a simple construction. For such an animal as a dog smell may be a 'pre-determined' selection. On its occurrence there ensues striving, seeking; there is nosing round, contact with this and that,

eating, the taste which satisfies the striving. The smell and taste which were not in any temporal continuity are now continuous within the conative whole. They are in organic unity with one another. Hereafter that smell, as part of the same organic unity, can mean that taste ; an active construction. What is all important for the development of such perceptual 'active' constructions is the control which the individual has over bodily movements. Control of the limbs means control of cognitive link processes whereby various sense-impressions are woven into the endeavour process. Handling, looking, moving to and fro in working out an endeavour, brings *this* into relation with *that* as forwarding or arresting progress. Thus muscular sense-impressions acquire their significance side by side with the impressions of the special senses.

The integrations which are the outcome of conation, and the localization of sense-impressions, which is the outcome of both reflex and conative activity, form a long chapter in the history of the development of the individual. The point for our purpose here is that as a result of these active constructions we have retentiveness manifested in a new form. The object perceived on the occasion of sense-perception is a construction. It is *real* in that it is 'given' by the sense-impression occurring, but what is 'given' only partially determines what is perceived. *The object known is not an event in the life history of the individual, whereas the 'given' impression is.* This claim is essential for what follows as to imagery. In the active constructions of sense-perception there may be no imagery. When for the dog a given smell can mean a taste, and on the occurrence of the smell there ensues nosing round, hunting, there may be no imagery of taste. The sense impression now initiates the nosing round differently from the first occasion ; we may say the progress of the endeavour towards fulfilment is more directly sustained than before. To adapt language from *Alice in Wonderland*,

the situation is labelled more plainly than before, 'Seek me'. Yet even in these simpler forms of what is described as 'impulsive action', conation *may* be sustained by an image representative of fulfilment. It seems impossible to draw a line between the cases in which this occurs and the cases in which it does not occur. Adult experience would lead one to cite cases where there is difficulty in the fulfilment as the cases where imagery is present.

How is imagery here and imagery as it occurs in genuine cases of memory to be regarded? Imagery in the cases considered is the *supplement* to sense-impressions, and in memory proper it is the *substitute* for them. When we regarded a sense-impression of a given character as a continuation of a previous sense-impression, because it carried on the same function, we said this continuity did not imply the persistence of the sense-impression in any literal sense. It is not continued throughout the interval of time as a ghost process in any realm of sub-consciousness. As already pointed out there is no spatial structure within which to postulate continuity of function. If we use the expression 'structure' at all with reference to mind, it can only be in a non-spatial sense. We may use it to express the organization to which processes contribute in respect of work or performance. Viewing knowledge or conduct as a work or performance, we can conceive of the organization of knowledge and of conduct as a structure. To seek to predicate of such a structure 'existence', as it is predicated of a substance in space, or 'persistence', as it is predicated of an event in time, is meaningless. The structure is neither a substance in space nor an event in time, but a framework in which these are projected. We can only say of this structure that it holds for, or is relevant to, each moment of mental life. The 'function' of a process is its office or performance with reference to the work of knowing or doing or appraising. We can speak of continuity of function without the implication of any temporal continuity

in the performing or process as an event. We can therefore think of an image as continuing the work of a sense-impression. We have already considered how the repetition of a given sense-impression may continue the work of a previous impression. And just as we deny the existence of the first sense-impression during the interval between its occurrence and the occurrence of another impression of the same kind having the same function, so we deny the existence of an image when not actually occurring.

What then is a memory-image? Whence comes it? It is not 'given' as the sense-impression is given, and it is not the persisting vestige of the sense-impression. To arrive at the answer we may turn to the consideration of what seem at first sight kindred facts; viz., after-images and recurrent sensations. After-sensations or after-images are probably the supposed justification for conceiving of memory-images as differing only in degree from sense-impressions, whereas in our opinion they differ fundamentally in kind. After-sensations are lingering sense-impressions whose being as events can be regarded as independent of any other process in the life of the individual. They are 'given', and occur under the same general conditions of stimulation as sense-impressions. In the case of recurrent sensations, however, the above dictum requires some modification. Although the same conditions of stimulation are necessary, there are needed in addition certain features in mental life itself, notably, the absence of any strong conative tendency in relation to present sense-impressions. Recurrent sensations arise when the individual is at a loose end, frequently when he is ready for sleep. Their occurrence is due to two sets of conditions; in so far as they require strong original sense-impressions and will only occur when these have been given, they are of the nature of after-sensations, but in so far as they depend upon the presence of certain conditions in the stream of consciousness, they are akin to the memory-image proper. It is within

mental life that we must seek the essential conditions of the latter.

Memory is cognition of something known before. The particular memory is in continuity with the former knowing. The former knowing was occasioned by sense-impressions; the image continues the work of the former sense-impressions. Since this continuity is not occasioned by a repetition of the sense-impressions, it can only occur as an event because it is 'required' by the character of the mental processes themselves. We may say that it stands to those processes in a part-to-whole relation, although we can only trace out the relation in terms of function. To take the simplest case of imagery, the imagery occurring in sense-perception; we have said that sense-impressions could be integrated into an organic unity by conation, a unity, that is, wherein any part is relative to the whole and implies correlate parts. That unity of sense-qualities with the same spatial reference, which constitutes a sense-thing, is an instance of such an integration. When one or more of these qualities are known on the occurrence of sense-impressions, others can be known by imagery. The child who 'opens his mouth and shuts his eyes to see what the king will send him', may visualize the tasted peppermint. Such imagery is occasioned by the given sense-impression as its complement; it is 'required' or provoked by the cognitive function of those given processes. Sight and touch in particular illustrate this reinforcement of impression by imagery. Similarly, when conation has linked sense-perception with sense-perception in the fulfilment of its endeavour, when they have entered as parts into the furtherance or frustration of striving, and thereby have come into organic connexion one with another, the occurrence of one sense-perception will require the other as its complement. If the one be 'given', in the sense that the function of perceiving is sustained by sense-impressions, the unity of the whole will occasion the cognition of the others, and that cognition will be sustained

by imagery. The sight of his play-box may suggest to the child the idea of his absent play-mate. If we ask, then, 'what brings imagery into being?' the answer is, the nature of cognition and conation. Granted that one cognitive process can carry on the function of another of the same character as itself, granted that there are within mental life active processes of wanting, striving, the running of whose course brings about the relations of cognitive processes to one another and to conation, such that any one is incomplete in respect of the function of that conation without the others, then, if hereafter a part of this organization (or 'structure') be given, and the processes necessary for its completion be not given, those processes will be reproduced in imagery. The organization of the whole requires this. There is here, as in the simpler cases already considered, persistence and continuity of function. The imagery does the work of sense-impressions and is an event in mental life just as a sense-impression is an event.

If we consider the points adduced in text-books of psychology as distinguishing images from sense-impressions, we shall see that they are such as we should expect from the conditions of the occurrence and the function of images. Their fragmentariness and lack of distinctness in contrast with sense-impressions is thus explicable. Only so much is required as will sustain cognition. That images should flicker in the manner described by Prof. Ward is also intelligible. Sense-impressions, as 'given', may be more or less abiding; their function can be repeated, or maintained; but the image vanishes when its function is performed. If I wish to recall my friend's face in detail, the image of the feature contemplated at each moment will be present, eyes, hair, mouth. To know the face as a whole in memory requires an effort. Fragmentariness will in part account for the lack of strength and forcibleness in images. Again, images occur against the background of organic sensations which are integrated with

present sense-impressions. It is but rarely that the organic sense-impressions are integrated with imagery in the cognition of the same object. When they are, the object known is confused with an object of perception ; e. g. in hallucination. The same is true of motor experiences ; eye and hand movements, which are interwoven with sense-impressions in the cognition of X or Y, are not integrated with imagery in memory of the same. Since the cognition which is sustained by imagery is occasioned by the demand of the trend of cognitive and conative processes, there is not in the image the arresting character that there is in the sense-impression. The 'given' can break across a train of cognition ; it can be totally alien to it in character and function. In denying this character to images, it may seem as if the sudden memories that startle us have been overlooked, e.g. the stab of a forgotten message which is remembered *à propos* of nothing at the wrong time. No doubt such memories occur, but their irrelevance is apparent rather than real, and their further consideration can be postponed until a later section.

How far this view of an image as a process in the life history of the individual due to continuity of function in the sense of work, is identical with Prof. Stout's doctrine of psychical dispositions, the writer is uncertain. It is obvious how much use has been made of his conception of 'conative unity'. 'Disposition' is apt to suggest a state of an existent something which persists between its manifestations, just as a muscular disposition built up by practice in rowing may be said to exist in one's arm between one practice time and another.

With Prof. Ward's view of subconsciousness and with his account of the memory-image, the writer has found difficulties. The primary difficulty lies in understanding the nature of a 'presentation'. The 'totum objectivum' as 'there', 'presented', is within the experience of the individual. Pre-

sentations are parts of this 'totum objectivum', picked out by the selective activity of the subject. They are said to stand in relation to one another and to the subject. What is not clear is whether a presentation is regarded as 'what is known'. Granted that 'what is known' is a psychological object, and as such is in relation to an individual knower, 'what is known' is nevertheless not treated as a mental process, yet it would seem that only presentations in the sense of processes could enter into the temporal march of an individual's experience.

When Prof. Ward speaks of the plasticity of the presentation-continuum, his teaching may be made applicable to sense-impressions as processes, or to the objects known by the subject when the processes take place. Yet when Prof. Ward asks, 'what is it that persists?' and replies, 'On our theory we must answer, the continuum as differentiated, not the particular differentiation as an isolated unit' (*Psychological Principles*, p. 81), the stress appears to be on the individual's world as known, rather than on the occurrences within his ever-changing experience. The account of the involution and evolution of images is particularly baffling. Like Sir W. Hamilton, Prof. Ward makes use of the conception of subconsciousness and gives it a double significance. It stands for the field of the 'given' which at any moment is 'beyond' the subject's attention, a shadowy border-land from whence a 'this' may be now within, now without experience. But it also stands for a realm of images, and this would seem to imply that images are persistent entities. Prof. Ward faces the difficulty which confronted Hamilton: Do all experiences persist? and whereas Hamilton solved the puzzle by allowing some experiences to decline into impotence under the pressure of others, Prof. Ward solves it by making one and the same image do duty for several ideas. An image is compared to a word in a concordance, which although it appears but once, stands in many references. The Herbartian

terms 'involution' and 'evolution' are used respectively to express the processes whereby what was specific and particular comes to be represented by a bare concordance-image, and the contrary processes whereby such an image takes on again the full setting of the particular and specific. But is the image which takes part in these processes a persistence of the old sense-impressions which occurred when sense-perception took place, or is it the persistence of 'what was known' on that occasion? One is almost tempted to ask whether, in view of its relation to subjective activity, it is an entity created by that activity, bearing in its 'temporal sign' a mark of the minting? But such an interpretation seems foreign to Prof. Ward's general view. In favour of the first interpretation is all Prof. Ward has to say on the fragmentary flickering character of images, but against it is his treatment of the memory-image as the object known in memory. It is difficult to think of the object known in memory as taking part in the changes of involution and evolution. We have in fact in the case of the image a parallel difficulty of interpretation to that noticed in the case of presentation. Taken as the persistent vestiges of sense-impressions deposited in subconsciousness, images would differ in degree rather than in kind from these, but Prof. Ward expressly states that they are not the mere residua of changes in the presentation continuum, though a distinct effect of them. From the stress laid on attention as a condition for their existence, and from the statement that they have the form of the percept, they must be interpreted as being in a different category from sense-impressions. If we treat them as the persistence of what is known in sense-perception, as deposita for a disposition of cognition, we shall be forced to think of the object of sense presentation as persisting in the subconscious experience of the individual, and as undergoing change with the temporal progress of his life. This is a view which, to say the least of it, debars us from attributing to the psychological object

of sense-perception any permanence in its qualities or in its relations to other objects.

We have maintained that the principle of continuity in function will account for the fact that images occur to sustain ideas ; the same principle will also explain the order of ideas in train. The trend of cognition which requires the images will also determine their order ; it will be the order of a conative series. This is in agreement with Prof. Ward's teaching that the cause of association lies in interested attention, and with his differentiation of assimilation from association (cf. chap. iii, pp. 75, 79). It is even more evidently in accordance with Prof. Stout's view of direct association by continuity of interest. Further discussion of trains of ideas may be postponed to a later section.

(b) Knowledge of the past and introspection.

So far we have only considered imagery as sustaining ideas. We have not referred to memory as consciousness of the past. We have to account for the reference of the known object to the past, and in the case of personal reminiscence, to a place in the past experience of the experient. As was seen in the previous chapters, not all reproduction is memory in this sense. Many ideas occur without this reference back as part of the cognition.

Since we have regarded the image as an event occurring here and now, the pastness cannot be that of this event. We have not to claim that the individual is functioning both ' here ' and ' now ' and also ' then ' and ' there ', in knowing the past. It is the object known which is past, not the knowing. In seeking to explain the object as past, we have in the first place to notice the difference between sense-impressions and images. This in itself would differentiate the ' enjoyment ', to use Prof. Alexander's term, of sense-perception from that of ideation. But having said that, one must beware of thinking of the enjoyment of a process as if it were something other than the process itself. For us it is the process. Difference in

process will entail difference in the object known ; the idea is different from the sense object. But this generic difference will not serve to differentiate the ideas of memory from those of imagination, nor memories from quasi-memories.

The order of any idea as before or after another is, we have seen, primarily determined by conation, and this, in all conation involving our bodily activities, will be a fixed order. It is from such series of experiences that the contrast of past, present, and future can arise. When a series involving bodily performances has become familiar by repetition and is in progress, the members of the series in relation to the present actual member fall into two categories, the ' have been ' and the ' about to be '. Imagery may sustain the awareness of the earlier members and imagery may sustain the awareness of the later ones, but whereas there will be present conative endeavour in relation to the later, there will be none in regard to the former. The present moment arrives, as we previously described it, weighted with impetus from what has been. Continuity of the whole conative process will be experienced as forward trend towards the end of the series and away from the beginning. At a given moment there will be the ' given ' impressions, the images passing away, and the images emerging in response to the trend of cognition. The singing of a melody will exemplify the type of experience. There are the actual notes being sung, the echoes of the last notes, the fading images of the earlier bars, and the anticipation of the coming notes, which may be ' heard ' or ' felt ' ere they are sung. The contrast of present, past, and future is experienced, the ' is ', the ' have been ', the ' about to be '. It is an experienced difference of sense impressions, images ceasing to be and images coming to be, pursuant to the trend. It is an experienced difference which is independent of the character of the image in its cognitional function as the image of X or of Y. It is further a ' recognizable ' difference in the character of mental processes. For all labelling of mental processes may well be

without foundation if likenesses and differences are experienced without being recognized. Dr. Venn's little plan for upsetting the uniformity of nature was never to allow events to recur. (Venn, *Empirical Logic*, p. 97.) It would be just as destructive of science if one secured that when events did in fact recur they were not recognized. As we urged against Prof. Alexander, we can reach no psychology from differences which are merely experienced. The recognition of the difference in question is essential for a psychology of memory, and its occurrence as fact may in itself be considered as establishing the actuality of knowledge of mental processes.

The referring back of known objects to the past rests also on what one may term intellectual clues. The construction of any moment will be a construction relative to the knowledge structure to which the function is contributory; moreover for adult consciousness there are fixed references which stand out as milestones; the place of a memory in the past is determined by its place with reference to a fixed milestone; e. g. it belongs with a certain set of incidents, and their place has already been determined. Our knowledge of antecedents and consequents enables us to place 'this' before 'that', and thus to date one by reference to the other. It may be but rarely that the reference of the object back to the past rests purely on the relational value of the present image process, its deadness in contrast with the challenge of expectation and with present adjustment and preparation. (cf. Prof. Holt's volitional present, past, and future.) It is interesting to notice that where the accompaniments of conative adjustment are present there the 'pastness' of memory is lost. A narrator who tells of a stirring series of events and, by his facial expression and gesture and change in voice, experiences again active adjustment from moment to moment, lives amid the old incidents. We should hold, however, in contrast to Prof. Alexander, that just in proportion as the narrator lived dramatically through the experiences, they would for him lose

the 'pastness' which they have in reminiscence. A question from an auditor, or a demand for some adjustment to the present situation, will break the spell. The tale falls flat, the narrator now recalls the past events. His narrative may change its tense from historic present to past definite. In so far as the practical pull of the present is realized, the contrast of what was and what is is distinguishable. The fish of his story which he has just got into his landing-net will not leap back into the water while he lights his pipe from a proffered match. It would seem easier for reminiscence to become a living present than for anticipation to lose its character of futurity. The forward march of events has its base in the present, and anticipation cannot go far without being faced by alternative possibilities. There is no determination of activity to this road rather than to that, and the petering out of the trail brings us back to the starting-point. In day-dreaming, as distinguished from anticipation or expectation, the occurrence of alternatives is no obstacle to the course of ideas, but such day-dreams have not the stamp of time upon them. They are not the 'about to be' of futurity, but the 'may be' of possibility.

The form of memory which is most truly knowledge of the past is personal reminiscence. Since the present is always relevant to my experience of the moment, the past which is most strictly akin to this present is not the detached past time of objects known and deeds done, but the personal past of the knowing and the doing. It is in this form that memory raises directly the question of introspection, although, as we have tried to emphasize, all recognition of the distinction between past and present experience implies the possibility of introspective knowledge. But to remember seeing an eclipse, or losing a watch, requires, we should say, not merely memory of the seen eclipse, of the lost watch, but memory of a 'past state of mind'. We have then to defend knowledge of a past state of mind. How does such knowledge come about? If

one jettisons sense-impressions and images from the freight of mental life, the task of explanation may well seem hopeless.

Introspection is not primitive knowledge. It necessarily arises out of the experience which is constituted by mental processes, but is not to be identified with the mere having of a mental process. One is not introspective *qua* experient. To establish the position of introspection it is necessary to preface a note on the character of intellectual, as distinguished from merely cognitive, processes. We have treated the object of a cognitive process as a construction, holding that even in the cognition of such a simple object as a sense quality, if there ever be such a simple object, there is differentiation and assimilation. We have regarded a process as only functioning cognitively in so far as it continues the work of its kind and stands out from the mass of simultaneous processes ; that is, in cognition a process always has at least a minimum of meaning. We have seen that in sense-perception this minimum of meaning is greatly extended, as a consequence of the inter-connexion of cognition and conation. Through the unity of the conative processes working out an endeavour, cognitive processes which are not, as given, either together or in immediate sequence, come to be members of one whole. This inter-relating of cognitive processes takes a further form in what we may term ' intellectual processes '. We may use this term to distinguish the processes in question from the simpler cognitive processes of sense-impression and imagery. The intellectual processes are processes of comparison, analysis, and synthesis. Their function is cognition ; for instance, to name a single group, the cognition of relations. Such processes are not ' given ' and are not reproductions of the given, but they are derived from these simpler cognitive processes, and their derivation is due to conation in the form of attention. They arise in the working out of endeavour. At first the endeavour probably has a practical end, and the intellectual processes are means to that end, but with the organization of

knowledge the end of the conative processes may be found in the intellectual processes themselves. We have already seen that conation determines the order of cognition both in perceptual series and in trains of ideas, viz., the succession of interest. In intellectual processes conation brings about a new order, that of 'concomitance' for cognition. The needs of the moment may require the presence of an object which is not present. It can be reproduced and is thus brought together with some object which is present. E. g. the need of the moment is to write. A knitting-needle lies on the table, but no pen. This is reproduced as a memory-image. Alternate attending to the reproduced pen and the given knitting-needle results in a 'togetherness' of these 'knowns', a 'togetherness' relative to a purpose or end. Conation further would seem able to secure the slowing or holding of a cognitive construction even when the given impression or the image which sustained it is disappearing. Conation is furthered by some one feature of this construction and this is known to the neglect of others. Thus arises analysis. Analysis in relation to the constructions brought together is comparison; by it, the features in the given and in the reproduced which satisfy endeavour enter into the same unity. Relative to writing, the pen which is known in reproduction and the knitting-needle which is given are brought together. The features in the needle which satisfy the endeavour, as the features in the pen would satisfy it, are related to these features. Cognition of likeness and of difference results from such 'togetherness'. Conation controls cognition in intellectual processes. It can only work itself out in the given and the reproduced; it must find, not create its material, but the intellectual process may be said to be its production. Because conation naturally and inevitably brings about these cognitions which we regard as the function of intellectual processes, some writers have described intelligence as instinctive (cf. *Great Society*, G. Wallas, p. 43). But such extension of the term 'instinctive'

would be unfortunate. The denotation of the term 'instinct' in the practical sphere is already sufficiently vague; its extension to the theoretical would introduce confusion; moreover, such a term serves to conceal rather than reveal the essential connexion of cognitive and intellectual processes and the evolution of the latter from the former. No hard and fast line can be drawn between them. The conditions of the 'given' may often so favour the alternate knowing of 'this' and 'that' that the 'togetherness', which is the work of comparison, may seem as if it itself were 'given', rather than effected as a result of analytic attention. We cannot say 'thus far simple cognition and no further; hereafter, intelligence'; nor can we, with any confidence, deny the presence of intellectual processes in animals.

Introspection is an intellectual process, involving analytic comparison of the constructions of cognitive processes. It is analysis directed towards and satisfied in a special end, knowledge of experience, and as such is not likely to reach perfection so easily as the analysis carried on in relation to practical ends. Yet one may wonder whether early forms of introspection do not probably precede the intelligent study of the external world. Illusion, errors of practice, would furnish the incentive for this analysis whereby process and meaning would be distinguished in cognition.

Just as the recognition of things is of all degrees of complexity, from the bare familiarity with a totality, to the conceptual analysis of likenesses and differences, so the recognition of mental processes varies from familiarity with the kind of process embedded in the known to the analytic detection of its several features by the trained observer. *Qua* cognitive processes, the sense-impression and the image are essentially knowable. As the processes which sustained knowledge of an object they underlie the knowledge constructions, and are discoverable by analysis. Let us consider an example: What occurs when I hear the front door bang? There may be just

simple cognition ; I am aware of the banging of the front door. Sound impressions occur and their function is cognition of a sound which is the banging of the front door. But just as this construction could be the occasion for intellectual analysis wherein, say, the sound would be compared with the back-firing of a motor car or the falling of a heavy object, so also it can be the occasion for introspective analysis ; and the construction ' the banging of the front door ' will be analysed into the cognitive processes experienced and their meaning. Such analysis will separate out the sound impressions in the knowledge construction. But these impressions as components in the mental life of the individual will stand in organic unity with other cognitive processes, whose function was not cognition of the door and which therefore did not appear in that knowledge construction, and which would not be revealed by any analysis of it as knowledge of ' the bang of the front door '. These are the organic and muscular processes, say of tingling and of pressure, which would have their function in knowledge of tingling ears, of physical compression. Analysis of the bang of the door undertaken by introspection reveals these impressions since they are directly continuous with the sound impressions in experience. Can introspection give knowledge of processes which are not cognitive ? Can it analyse the displeasure with which the bang was heard, the desire to call back the sinner to make him shut the door properly ? The answer is ' No '. Analytic introspection is an intellectual process and as such can only arise in connexion with the constructions of cognition. But the consequences of this admission are not so dire as may appear at first sight. It may seem as if the utmost we could ever say with regard to affective and conative processes would be that we know that they occur. But mental life is all of a piece, and cognitive processes are permeated with affective and conative processes. We have seen it to be true of intellectual processes, that conation is the controlling factor in their occurrence.

We may be said to know feeling and conation much as we might know the shape of an invisible object by knowing the form of the hole which it filled. We experience feeling and experience conation, know the cognitive processes which these processes colour and order, compare the cognitive processes accompanied by one kind of feeling experience with those accompanied by another, compare this sequence of cognitive processes with that. One may say that our knowledge of feeling and conation is all of the *oratio obliqua* type, but it is knowledge none the less.

Now we must come to the all too long delayed question, knowledge of our past experience in memory. To consider the same example, what occurs when I remember *hearing* the front door bang, say, half-an-hour ago? There is the image of the bang, continuing the function of the sense-impressions of half-an-hour since, an image which apart from introspection would enable me to say, 'I remember the banging of the front door.' The image is the reproduction of the cognitive process, and is revealed to introspective analysis in the same way as we considered the sense-impression would be revealed in introspection of a present process; it is revealed as an image sustaining cognition, which cognition is past. The image process is thus analysed out from the knowledge construction it sustained. There is, for introspection, knowledge of the past experiencing, which experiencing bears the meaning, memory of the hearing of the bang. Just as in the parallel case of introspection of the sense-impression, introspection may here also reveal images of the cognitive processes directly connected with the sound-impressions, the organic and muscular experiences. It is unimportant for our purpose whether these are reproduced in imagery or are, as some psychologists think, renewed as actual sense-impressions. They will be comparatively feeble if they are so renewed, but whether renewed or reproduced their relation to the imagery of the sound is such as to make them 'dead'; their cognitive

function is memory knowledge of past tingling ears and bodily compression. The displeasure of the original hearing was experienced as the accompaniment of these experiences and may be actually renewed by them now, and thus experienced. If not, it is remembered obliquely by the sense-impressions. Our desire when it occurred was not a process swinging in the air. As we entertained it, we may have had a vision of the sinner recalled, the droop of his figure, or, if we are not pictorially gifted, our desire may have been accompanied by motor imagery of a dash after the delinquent, of the grip which detained him. When we wish to recall, then, our hearing of the door bang and our displeasure and desire to haul back the culprit, there are cognitive processes enough and to spare, the reproduction or renewal of which will afford constructions open to the analysis of introspection, and thereby reveal to us our past state of mind. The contrast of imagery and sensation, which is fundamental in the memory of things, the direction of the analysis, the deadness of these constructions in comparison with the constructions of the forward trend of consciousness, date the reminiscence as past. The place of any reminiscence in a chain or in relation to the fixed milestones of experience will furnish further clues parallel to those which we noticed as important in the dating of non-personal memory objects and events.

There is a further point we must touch on in this connexion; one which raises the question of infinite regress. What is the nature of a memory of remembering? Suppose some one says, 'I remember recalling his prophetic words as I heard the news of his success', what does this statement imply? This may mean that the speaker remembers the fact that he had a memory of the prophetic words on the occasion referred to. It may, however, mean that the speaker is now recalling his state of mind on the occasion of hearing of his friend's success. The interest of the speaker and the direction of his intellectual operations are different in the two cases. In

the first the orbit of memory is primarily determined by the success of the friend and his prophetic utterance. As a memory this latter could have had a reference to the time of the original hearing, and a reference to the time of the recall ; it is actually dated by reference to the occasion of hearing of the success. The relation of the words to the occasion in question is the relation of a memory to a perception, a relation of which the hearer was implicitly aware on that occasion ; it was at that time a bit of cursory introspective knowledge, and it is *this relation* which is remembered on the present occasion. In the second case the orbit of memory is in introspective analysis. The introspective analysis of the knowledge construction (memory of the occasion on which the success was announced) which yields memory of the hearing, will also by direct unity of interest re-instate the cognitive processes which sustained the previous memory of the friend's words. Both alike are reproduced in consciousness as imagery, and as imagery are ' here ' and ' now ', but the temporal reference for introspection of the cognitions which these processes sustain is past ; they are past experiencings of *one and the same date*. Their value relative to one another, however, as respectively a perception and a memory, is a relational value of two knowledge constructions, which in respect of their *meaning* are referred to different dates.

Here comes in the question of infinite regress. How far can this programme of reflection on reflection be carried ? Does not such introspection pushed to its logical conclusion become absurd ? In reply one may bring forward two considerations. It is not only the memory of a memory which is a reflection on reflection, but, in accordance with the account of introspection given above, so also is the memory of every intellectual operation. Those who raise the cry of infinite regress when asked to accept the memory of remembering, would accept quite readily such statements as ' I remember becoming doubtful about his ability ', ' I remember being puzzled by the problem '. Yet the introspective analysis in-

volved in the memory recalled in the first case is not in principle different from the intellectual operation recalled in the two latter. Even supposing they belong to the class of those who contend that the above statements mean nothing different from 'I remember *my* doubts about his ability.' 'I remember the puzzle which confronted *me*', they cannot ignore the significance of the 'my' and 'me'. The doubt or puzzle is not merely remembered, but remembered as being related to something or other, to some class of facts in virtue of which it is '*mine*' or 'before *me*'. This remembered 'relatedness' must presumably have been recognized as a relation when the doubt or puzzle in question was originally known. We may argue, in accordance with the view of introspection here sketched, that whereas the memory of remembering is explicit remembrance of introspective analysis, the memory of 'my doubt', &c., is only implicit remembrance of the intellectual operation of seeing the relation whereby the doubt was recognized as mine. But unless we claim that this intellectual operation is implied, we cannot say that we remember the doubts as thus related. It is possible to object that 'seeing a relation' is not an intellectual operation or again that the conception of intuition as an intellectual operation is wrong. If either of these objections is true, the foregoing consideration is valueless.

Secondly, infinite regress in reflection is no greater puzzle in fact than is infinite division in perceived extension. In the latter case we arrive at a minimum visible, accept it, and allow that it will vary with the sensible discrimination of the individual. So in the former, we arrive at a limit to introspective analysis and recognize that this too will vary with the individual.

(c) *Belief*.

We saw in the previous chapters that Belief was involved in memory knowledge and that the differentiation of memory

from imagination was one of the problems to be faced by any theory of memory. The account given of the trains of ideas implied such a distinction, but it has to be established and brought into relation with the general programme here outlined.

Belief is nothing which can be discovered by an analysis of the imagery which enters into memory and into imagination respectively. It is a term which has reference to the construction of knowing. In sense-perception the construction is determined by the nature of the 'given now', and by past experience, which was in its turn shaped by the given. The construction, then, as it occurs may be said to be determined or 'necessary'. This will be so, whatever value Logic may put upon the cognition as true or false, and holds as much for the active as for the passive constructions of sense-perception. In memory, imagery takes the place of sense-impressions, and such imagery is, on the view here taken, 'required' by some process or processes of the present, by the present knowing or feeling or conation. It is, if one wishes to use a blessed shibboleth, a response, and its function is a memory construction. This construction, like that of sense-perception, will in most cases be determined by the image. The fuller the imagery and the stronger the determination of the trend of mental processes in which such imagery occurs, the more 'necessary' the construction. But where imagery is scanty, or where the requirement of the present may be completed now by this image now by that, the construction lacks coherence, lacks the character of necessity. In imagination the image required by the present moment of consciousness functions in accordance with the trend of the moment, but this trend is either one lacking a foreseen end or is one for the end of which past success or failure is irrelevant. The conation may be a wandering interest, changing direction from moment to moment, influenced by emotional needs rather than by the conditions of a purposive aim. Just to the extent that the conative

interest which requires, or is answerable for the presence of, the image and its function, is lacking in systematic determination, to that extent the construction will lack the character of necessity and there will be no belief. Whatever account we may be able to give of the features which belief may entail in feeling and in action, belief itself as a psychological term would seem to denote a type of cognitive construction. It is not the name for a specific mental process; 'believing' is not comparable with 'fearing', 'wanting'. As a type of construction, however, it can be recognized by introspective analysis when implied by the cognitive processes. At the beginning of life all cognition may be said to be believing, but the same experiences, which we have referred to as furnishing the incentive to introspection and intellectual analysis, viz., errors, illusions, failures, would lead to the differentiation of types of cognitional construction. Thus it comes about that the adult can answer the question, 'Do you believe that?' much as he can answer the question 'Are you hungry?' His answer is based, not on the immediate evidence of a given process or group of processes in mental life, but on an analysis of the knowing with reference to the whole trend of experience. Only so can the clue be found to the point of the question: Is the construction for you a necessary one?

(d) Trains of ideas, and the unconscious.

As we have denied the persistent existence of memory-images as vestiges of sense-impressions in any realm of sub-consciousness or of the unconscious, it is perhaps necessary to explain what meaning we would attribute to these terms, and at the same time to supplement what was said in the first paragraph with regard to trains of ideas. The unconscious or subconscious which is denied is the unconscious which is supposed to contain ghosts of past mental processes, a bundle or load of attenuated cognitive, affective, and conative processes, borne perpetually by the experient, just as the old man

of the sea was borne by Sinbad the Sailor. For some writers it is the load of the individual's past, for others it is the load of the race, for others again it is both. There is no denial of subconsciousness or the unconscious in the sense of present mental processes incapable of detection by introspective analysis. The stream of mental life is conceived as broader than its recognizable current. This meaning is comparable with the first of the two meanings of subconsciousness noticed in the reference to Prof. Ward's doctrine. It is usual to adopt the term 'subconscious' or 'the foreconscious' for those processes which may with a shift of interest pass the shadowy border separating the unconscious from the conscious, and to reserve the term 'unconscious' for the processes of whose presence there is only obtainable the indirect evidence of their influence upon other processes. But the conscious and the unconscious processes are regarded as essentially one, as together constituting the mental life of the individual at any moment ; and all that was said with regard to retentiveness in the first section of this chapter was said of mental processes, cognitive, affective, and conative processes irrespective of whether the processes were conscious or unconscious in the sense defined. The continuity of function due to direct sequence, similarity in character, membership of a conative unity, will hold for the unconscious processes as well as for the conscious. We want here to consider the consequences of this view as regards trains of ideas.

We noticed that reproduction often made its appearance à propos of nothing at all, so far as our analytic attention could detect, and that such reproduction seemed to contradict our claim that it is the conditions of mental life which require the reproduction of the image. Some of the instances cited as cases of such reproduction are in truth recurrent sensations and not memory-images, and the conditions of their occurrence lie in the strength of the original stimulus and in the absence of any definite interest in the present. They are in

a sense a continuation of a function, the continuation of a function not worked out on the original occurrence. The fact that they are frequent in cases of general fatigue is in favour of this suggestion ; as is also the fact that they may often be dispelled by a repetition of the function in terms of sense-impressions. The actual playing or hearing of a tune which has been running in the head will often free us from its haunting insistence. But other so-called irrelevant memories are found to be such only in relation to the main threads of conscious thought. Careful interrogation will discover in the margin of consciousness the conditions of the reproduction. Where even this fails, it is legitimate to infer that the conditions lie in processes of which we are not conscious. It is perhaps these sudden 'irruptive' memories, which break through a present interest and call for motor readjustment, that approach most nearly to the 'given' in their forcibility. We have recognized in conation the condition for the association of ideas. The findings of psycho-analysis should lead us to recognize in the flotsam and jetsam of so-called chance associations the signs of such conational integration in processes which escape introspection. Both the suggestive and the repressive or inhibitive value of a perception or idea find their explanation in conation and its ally appraisement. In dealing with the constructions of sense-perception we distinguished passive from active constructions, and we should wish to introduce a parallel distinction in the case of sequence of ideas.

Whereas the Behaviourists and Presentationists rely upon temporal contiguity and upon similarity in stimulation for the explanation of the conditioned reflex, of learning by experience and of all forms of association, and are thereby driven to endow repetition with a mystic potency, there is a possibility of erring in the opposite direction. It is possible to overlook the consequences of assimilation, and the impetus of mental processes as successive events. The operation of assimilation

is seen in so-called 'Reproduction of Similarity', and also in 'Divergent Associations'. The sight of a casual person in the street calls up the idea of a distant friend. Why? There is no need to seek a subtle motive here. In analysing the experience we find the line of the eyebrows in the face before us is like that in our friend's. Out of the complex of given sense-impressions, just these by continuity of function are able to reproduce in imagery those of the same character as themselves, and this imagery to reproduce those other features which make one whole with it, and thus to sustain the idea of our friend. Again, in reciting a poem, a phrase will switch us off from one verse to another where the same words occur, or a bar in a tune we are humming may carry us over into another melody where the same arrangement of notes occurs. It seems gratuitous to look for an explanation in the subconscious. Each verse and each tune was a unity in itself, but the link for diversion from one to the other lies in assimilation. Full allowance should be made for such passive sequences in the train of ideas. The 'Oh! by the way' and the 'That reminds me' often stand for just such a passive linkage of series, each of which in its formation may have been an instance of active association. It is in day dreaming and night dreaming, where there is an absence of a conscious dominant purpose, that such transitions are common. Efforts to explain the change in drift by unconscious wishes often border on the grotesque.¹ It

¹ Examples of instances which require such explanation are to be found in Varendonck's *Psychology of Day Dreams*, though unfortunately he uses this explanation to the exclusion of any other. In contrast one may cite the following as an instance of the grotesque introduction of symbolism and the unconscious wish, where 'perseveration' bare of all purpose would be adequate as explanation. 'There is a man adding a column of figures. . . . He adds the tens and units of each number alternately, from the top downward, . . . and then verifies by taking the numbers upward. . . . It does not agree with the first time, and finally he finds that in going downward he has said 351 for 356, having repeated the 3 of 43 instead of saying the 8 of 68.' (68 followed 43 in the descending order of figures.) 'Of the numbers alone he was

should perhaps rather be the task of psychology to explain why, in the network of ideas, there is not a more frequent occurrence of this assimilative passive transference. One may wonder whether it is poetic justice working through the unconscious that forces writers who would scorn to recognize design in nature, or to accept teleological explanations of physical events, to write of the unconscious as though it were endowed with a low cunning unmatched in the annals of the Old Bailey. In explaining the symbolism of dreams, too often the principles of association are flung to the winds. No attempt is made to show how the symbol has obtained the signification assigned to it. A reference to the 'canny' unconscious in pursuit of some nefarious design, settles the meaning of the symbol and that is an end of the matter. It is an end of the matter so far as a coherent conception of mental life is concerned.

Study of the conditions of forgetting and reproducing nonsense material, of the influence of the number of repetitions, of the distribution of repetitions, of the effects of lapse of time, serves to show the importance of direct continuity of process, and also of the continuity of function from occasion to occasion in respect of similar process. One might describe the most favourable interval for evoking reproduction as the one which best enables this continuity to be manifested. Experimental work is throwing much light on this and on kindred problems. The writer ventures to think that there is nothing in this work which requires a memory image to be interpreted as an entity

aware. But what made him take 3 instead of the 8? That was taking the 3 twice. Had he any special predilection for threes? He had. Every one has, for it is the number which has, in the hinterland of the mind, the closest connexion with creativeness, and every one would be creative. Also the number ignored is 5. The number 5 is linked in the memory of the race with weakness and solitude. Hence it tends to be expunged or forgotten in favour of 3, wherever there is a possible alternative between them as here.' (Lay, *The Child's Unconscious Mind*, pp. 23, 24.)

persisting in subconsciousness and undergoing changes with the passage of time. One may refer here to the essay of Dr. Ballard¹ on reminiscence and obliviscence. His work, like that of Dr. Adolf Jost, shows that a certain lapse of time favours reproduction; that reproduction is fuller and more correct after an interval of forty-eight hours or more, than immediately after the presentation of the material. It is this later reproduction which he styles reminiscence. Experiments by Miss Ephrussi pointed to absence of strangeness in any material to be learnt, as an important factor for the effectiveness of repetition. It is reasonable to suppose that the associations and intellectual relations into which newly presented material may enter are not all effected in a moment. They are more likely to be completed quickly in the case of a person whose knowledge is fuller and more organized than in the case of a child whose knowledge is scanty and unsystematic. Knowledge constructions are always being modified, reorganized, added to by cognitive processes. It is quite impossible to say that between the presentation of the material to be learnt by heart and its reproduction, the knowledge constructions concerned have not been brought into new relations and new associations through new items of knowledge. Dr. Ballard found more reminiscence in the case of children than in the case of adults, in the case of sense than in the case of nonsense material. This is what might be expected if the fuller reproduction depended upon the consolidation of knowledge, and not on the persistence of images.

The metamorphoses of images, when recalled from time to time, and their deterioration, so far from being evidence in favour of a persistent existence seem to be evidence against such persistence. The changes in question would seem to be

¹ *Reminiscence and Obliviscence*, P. B. Ballard, Monograph Supplement B. *Journal of Psychology*, No. 1, 'Die Assoziationsfestigkeit in ihrer Abhängigkeit von der Verteilung der Wiederholungen,' A. Jost, *Zeitschr. f. Psychol. d. S.*, Bd. 14; P. Ephrussi, *ibid.*, Bd. 37.

changes in the conditions of reproduction ; the suggestive factors vary. The influence on imagery of general ideas, of emotion, and of the general setting of mental life at the time of reproduction, is very great.¹ Whether a point is reached at which reproduction is impossible, it is difficult to prove. We might expect complete decay here as with other forms of life, that a function might, after lapse of time, having fallen into disuse, be incapable of being continued ; an item of knowledge would then be forgotten beyond possibility of recall.

In the end all questions as to the nature of a memory-image must be tested by experiment. This essay only purports to be a discussion of theories. It will have served its turn, if it has shown how far reaching in its consequences may be this question which lies in the heart of the memory problem, the nature of a memory-image.

¹ Cf. *A Qualitative Analysis of the Process of Forgetting*, H. R. Crossland, Psychological Monographs, vol. xxix, No. 1, *Psychological Review* ; 'An Experimental Study of some Problems of Perceiving and Imaging,' F. C. Bartlett, *British Journal of Psychology*, vol. viii, pt. 2.

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